

UAS Education Series

No. 9

PERSPECTIVES ON AGRICULTURAL EDUCATION



1987

**UNIVERSITY OF AGRICULTURAL SCIENCES
BANGALORE-560 024**



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AGRICULTURAL EDUCATION



University of Agricultural Sciences
G.K.V.K., Bangalore - 560 065

1987

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FOREWORD

The Agricultural University movement, started in 1960's in the country, has completed a period of about two and half decades. The movement has been acclaimed as a change agent that has brought about improvements in agricultural education and research. The concept of integration of teaching, research and extension, course-credit system of education with internal evaluation, and organization of teaching campuses with constituent colleges have been the main features adopted from the Land Grant College System of U.S.A. This adoption process has gone through different stages and passed through trial and error. The UAS, Bangalore is one of the Indian Agricultural Universities which have experimented with varied programmes in agricultural education and research, and have attempted to evolve a system relevant to the development needs of their respective states/regions.

The articles contributed by the Staff of UAS over a period of time on agricultural education are brought together in the form of this book, "Perspectives on Agricultural Education". The articles included in this book are meant to illustrate how thoughts and ideas have preceded the initiation and implementation of educational programmes in the University. Further these articles are also to be gauged in the context of efforts needed to make agricultural education more dynamic, forward looking, relevant and meaningful to the Indian conditions.

Agriculture is the predominant occupation of a large majority of people in India. This situation is most likely to remain for many decades to come. There is considerable degree of unemployment and underemployment in the country, and poverty in its worst form is quite visible across rural India. Because of favourable soil and climatic conditions, and

dispersed settlement of the people, agriculture allied with processing of products offers tremendous opportunity to provide adequate employment and improve opportunities for the people. This opportunity needs to be exploited by meeting the challenges so that socio-economic transformation of the country can be effected. Human resource development through appropriate widespread agricultural education can provide the much needed knowledge and skill required for the advancement of rural India. The Agricultural University pattern is very close to the Rural University pattern that is envisaged in the New Education Policy of the Government of India. The concepts of ruralisation and dispersal of agricultural education, earning while learning, work ethics, linkage between people's organisations and educational institutions, and people's participation are the ones that need to be given prime importance so that viable foundation for development oriented agricultural education can be ensured. It is hoped that the articles included in this book would provide some insights into the efforts required in this direction.

10-4-1987

S. V. PATIL
Vice-Chancellor

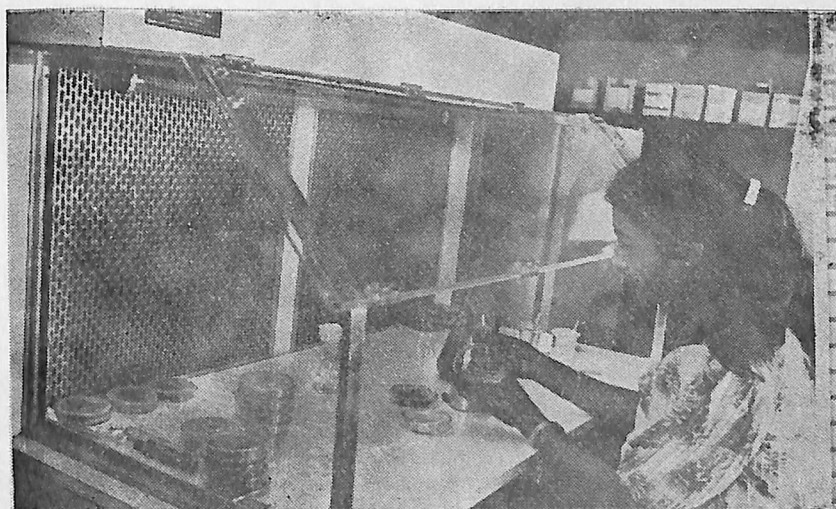
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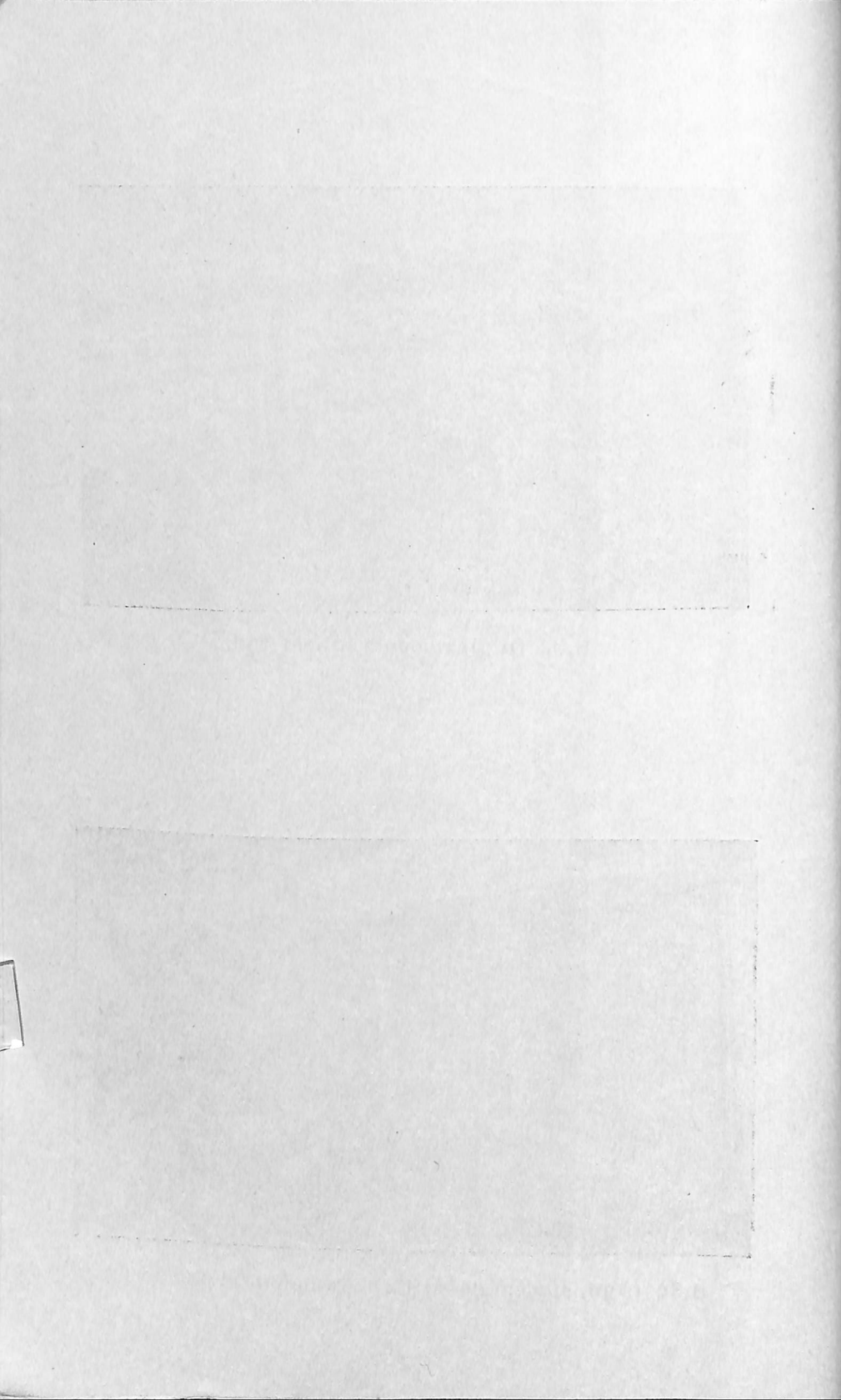
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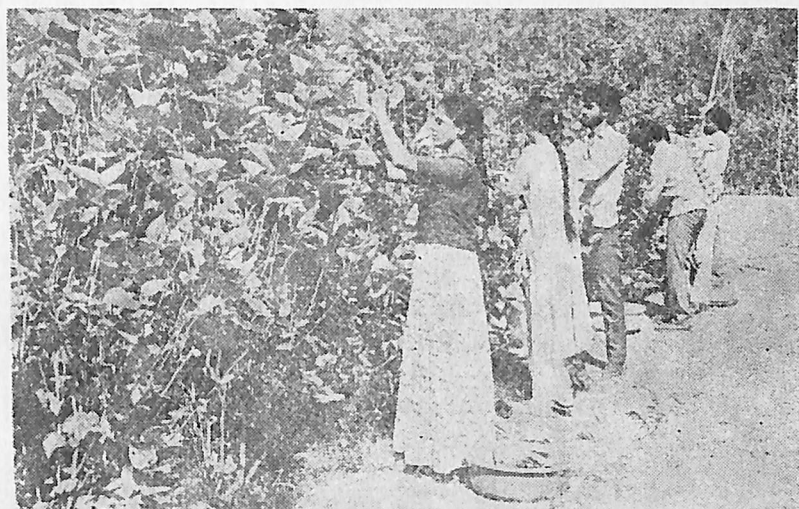


B.Sc. (Agri) students at field work



B.Sc. (Agri) student doing Plant Pathological practicals

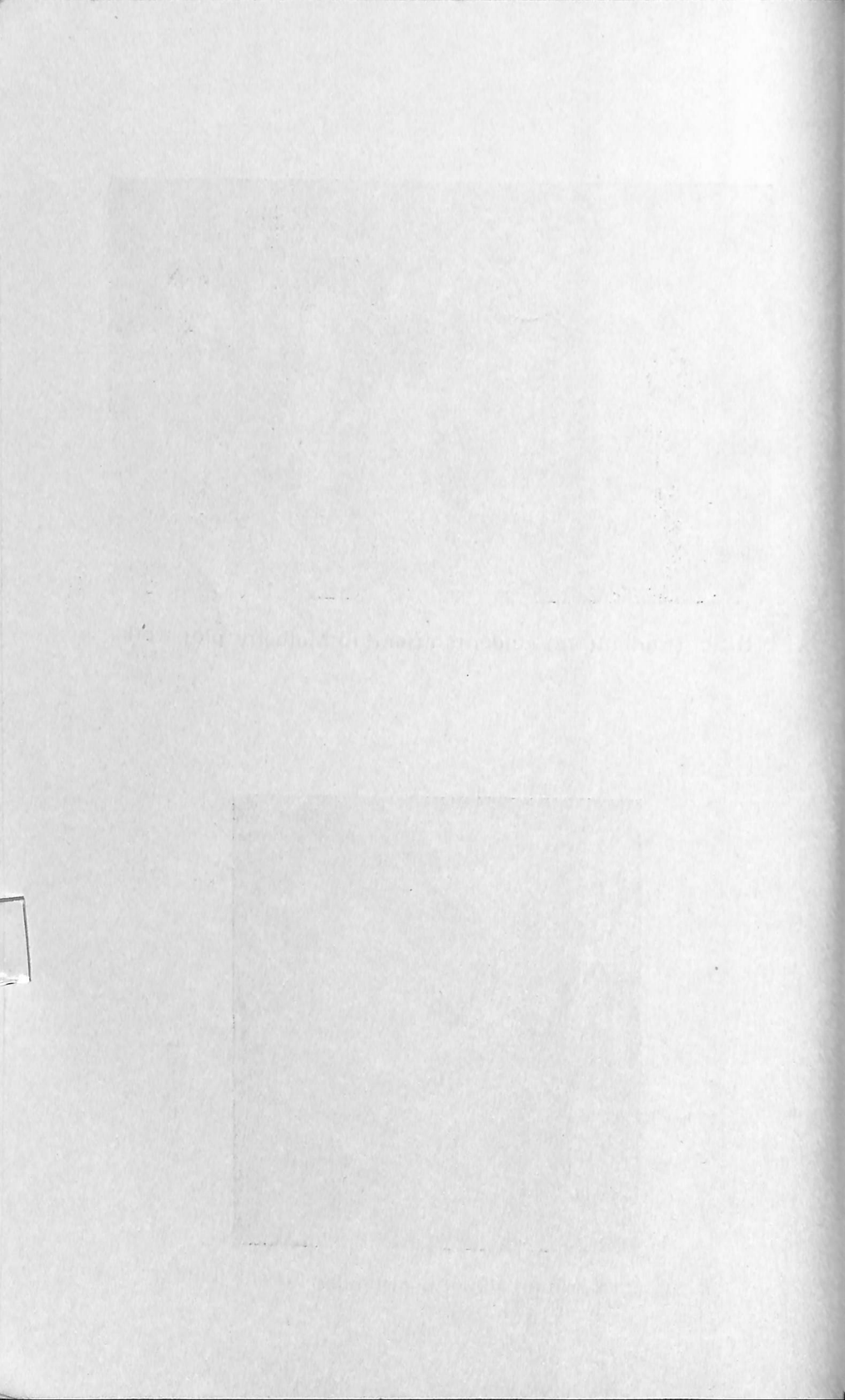




B.Sc. (Sericulture) students attend to Mulberry plot work



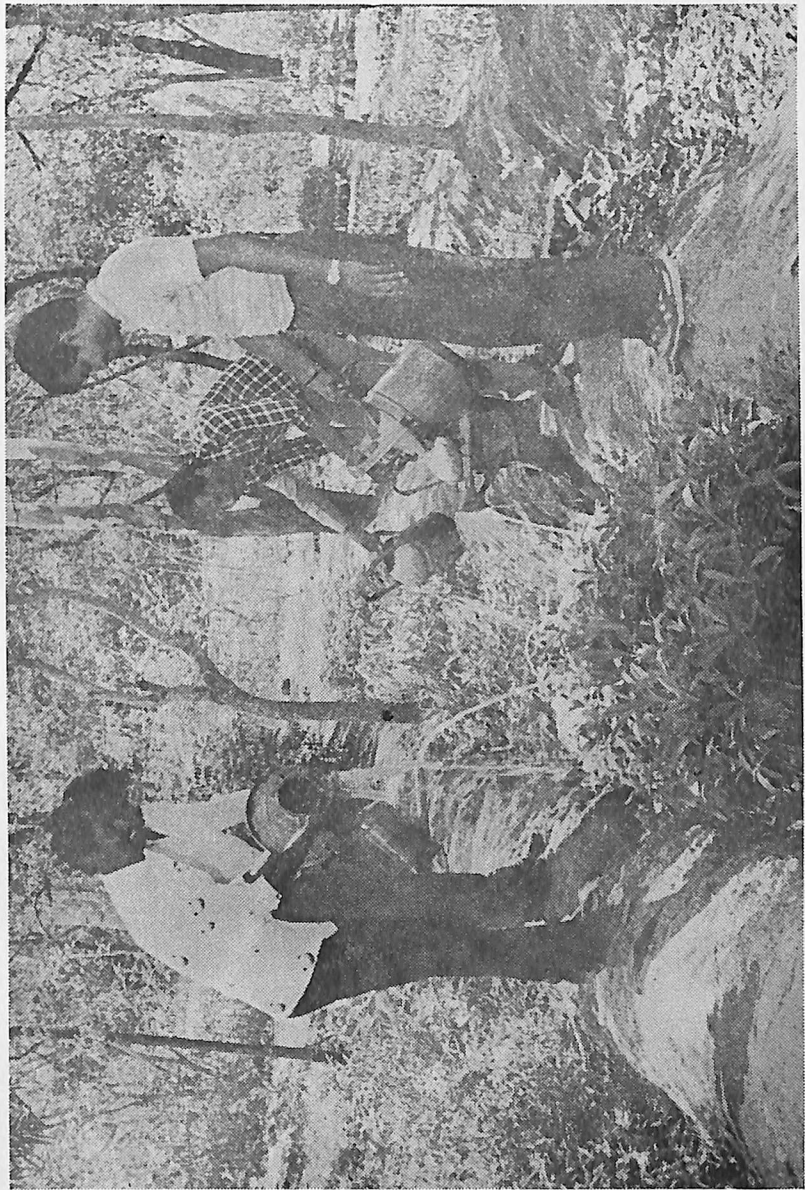
B.Sc. (Sericulture) students attending to silk reeling



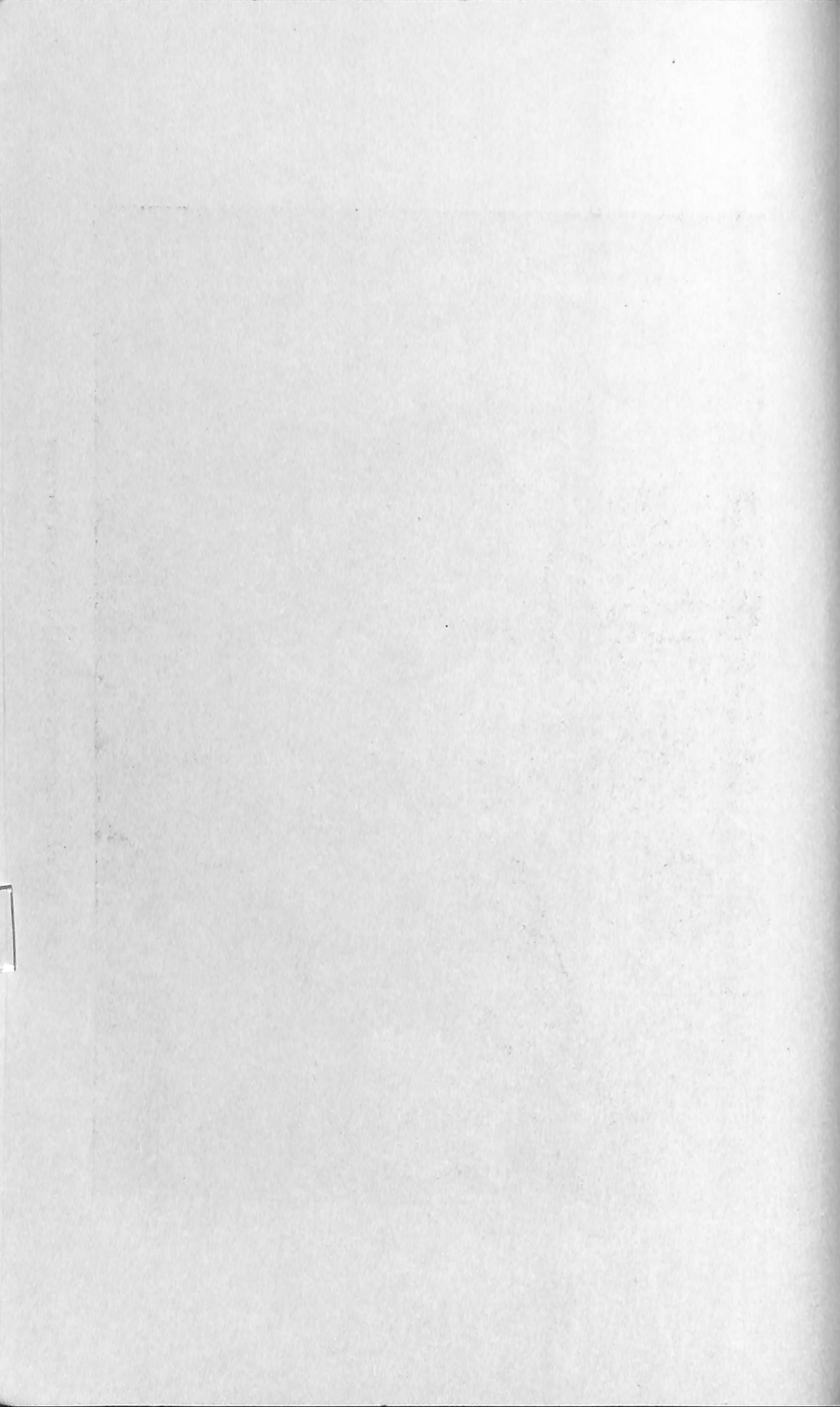


B.Sc. (Horticulture) students attending nursery practicals



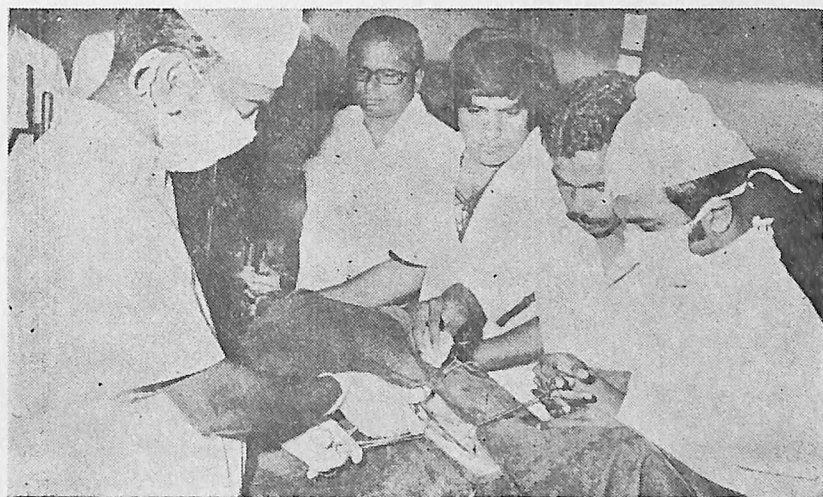


B.Sc. (Forestry) students working in Forest Nursery



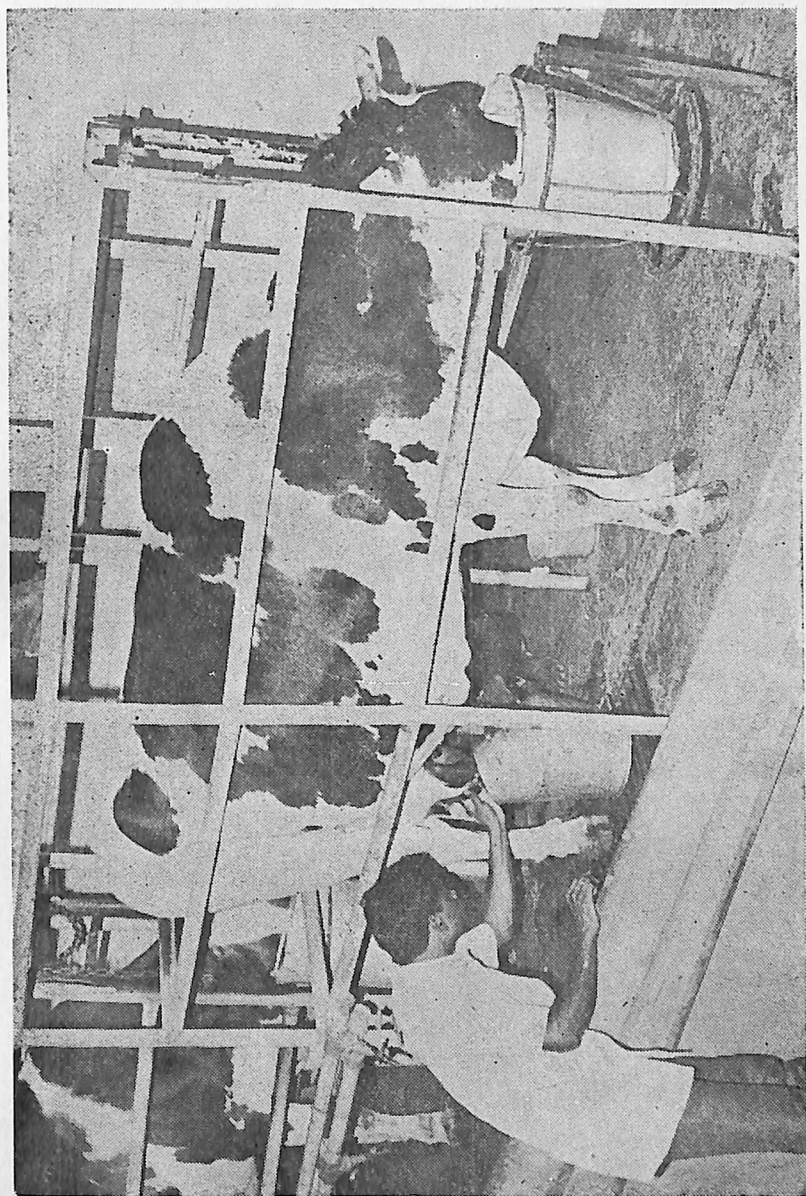


B.V.Sc. students at clinical work

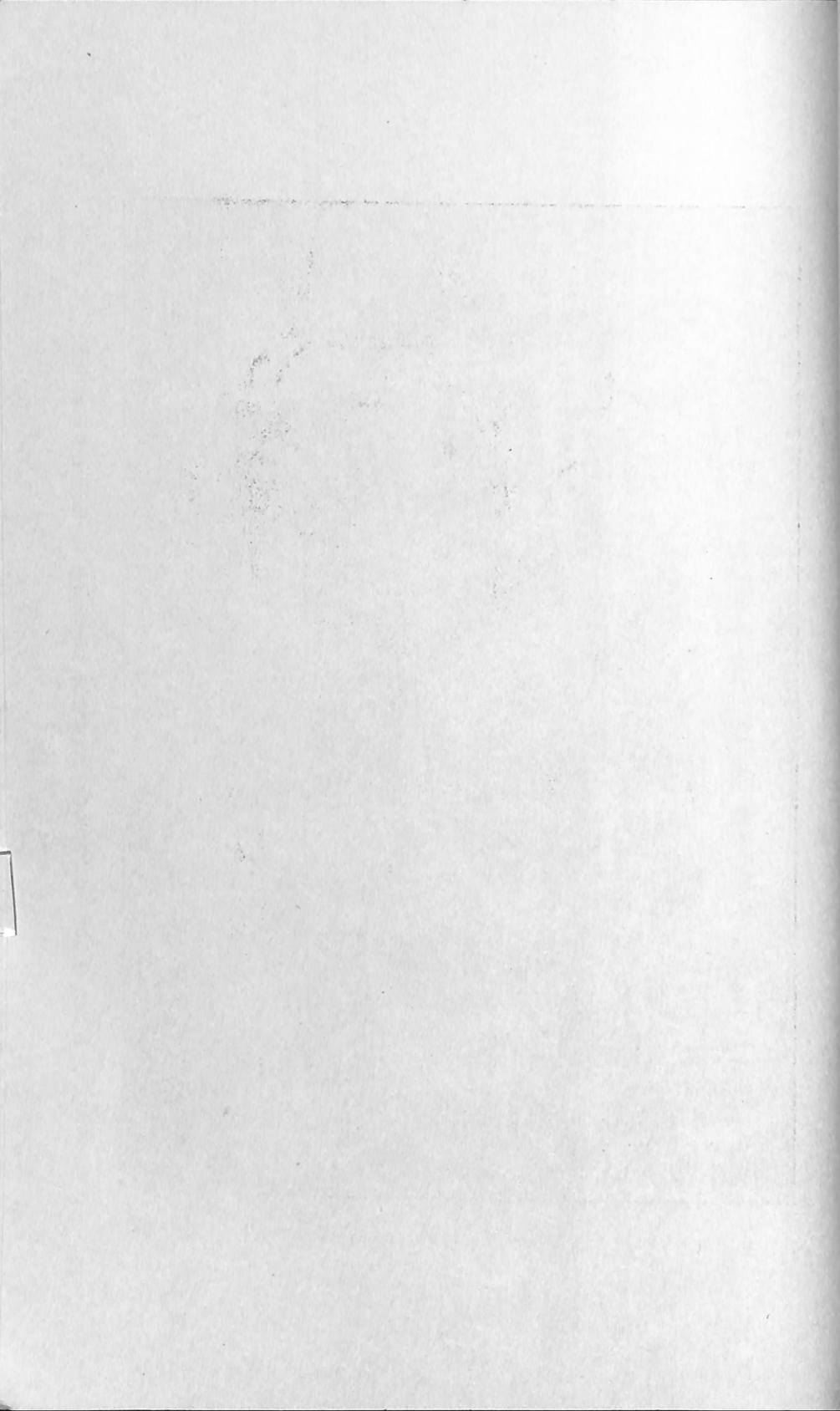


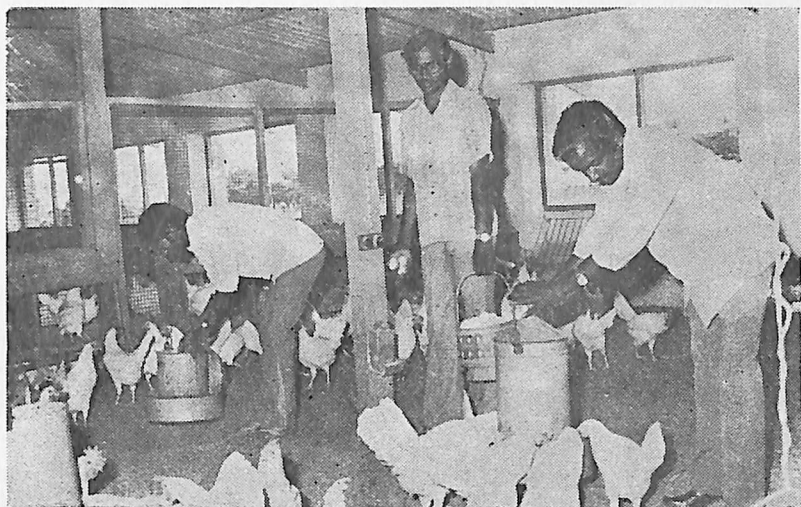
B.V.Sc. students performing surgery





B.Sc. (Dairy Technology) students attending to milking practicals

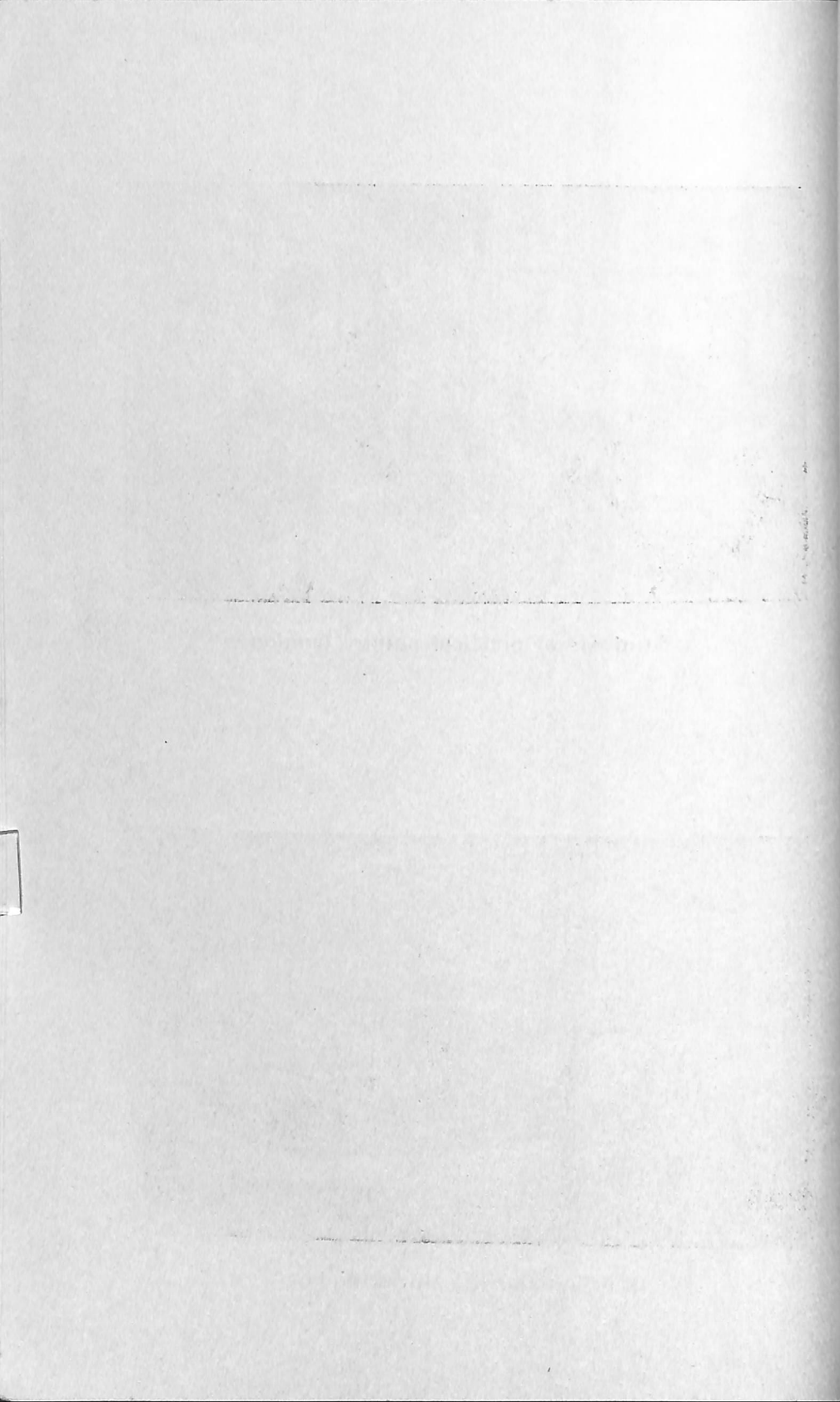




Students at practical poultry farming



B.F.Sc. students on fishing boat



PHILOSOPHY OF UNDERGRADUATE AND POSTGRADUATE AGRICULTURE EDUCATION

S. V. PATIL*

The aim of all education is to train the individuals so that they become more useful members of the community. In the process of education there is transmission of knowledge and skill and creation of motivation for applying what has been learnt. The knowledge and skill to be transmitted depends upon the community needs. The philosophy of agriculture education** would depend upon the knowledge and skill which could contribute for the development of agriculture. The goal of an agricultural education programme would naturally be to derive the maximum benefit from the investment made on agriculture education. For a successful agriculture education programme, the following aspects are important :

1. The background of the student,
2. The extent and quality of educational programme,
3. The extent to which the agriculture education meets the job requirements,
4. Opportunities the programme offers for higher individual accomplishments.

1. Background of the student : The agricultural and educational background of the student are the important criteria for admission. Family involvement in agriculture, interest and aptitude may be responsible for the student's desire for acquisition of knowledge and skill in agriculture.

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**The agriculture education here would cover education for degree programmes in different agricultural sciences.

The student with this background is likely to be greatly benefited by agricultural education and he may do well in meeting the community needs in the field of agriculture. The next question is how to identify such students and what percentage of seats could be reserved for such students or what percentage of marks could be provided for agriculture background during selection. Whether a production of a copy of record of right on land owned by father or mother or the student himself or certificate from Tahsildar that the parents of the student work as agricultural labourer would be enough or the entrance aptitude test or the combination of the two is necessary is a question to be considered. It may still, however, be necessary to evolve a mechanism by which at least some percentage of students who have no agricultural background but are otherwise exceptionally talented get admission.

As regards educational background 10+2 years of formal education is now mostly accepted for admission to degree programmes. This much of educational background may be quite necessary for a professional degree programme in agricultural sciences. Integrating 2 year PUC with degree programme is also worth consideration.

2. The extent and quality of the educational programme :
At present the duration of the degree programme in Agriculture Sciences in different Universities is as follows :

- | | |
|-----------|---|
| 1. 10+2+3 | For Agriculture, Horticulture and Home Science |
| 2. 10+2+4 | For Agriculture, Horticulture, Agricultural Engineering, Veterinary and Fisheries |
| 3. 11+4 | For Agriculture and Horticulture |
| 4. 11+5 | For Veterinary |
| 5. 11+1+3 | For Agriculture |
| 6. 11+1+4 | For Agriculture |

In view of considerable development in agriculture sciences, and the fact that any one degree programme cannot be considered in any way better than the other, it would be therefore, good from many considerations to provide a common duration for the different degree programmes, in Agricultural Sciences. The pattern of 10+2+4 seems to fit in well for all the degree programmes in Agricultural Sciences.

Regarding the type of agriculture education, a strong plea is being put forward to provide for more practical type courses so that the students not only acquire the scientific knowledge, but also get confidence in using that knowledge in practice. There is also now more stress on integrated technology which is also more labour intensive for increasing production. Plot work for each student is provided in many Agricultural Colleges. So also clinical work is provided in Veterinary Colleges. Similar practical type of courses need to be built up for other degree programmes in other agricultural sciences. It is, however, necessary to see that adequate facilities in terms of equipment, space and inputs are provided.

Another question is whether it is desirable to provide for Major Field of Specialisation at undergraduate level. The experience of the last few years with this provision indicates that there will be repetition in Major Field of Specialisation courses and Postgraduate courses. Further, this may restrict the employment opportunities. Still, however, providing a few credits say about 3 to 6 may help the students to get more attached to a particular Department in the Final Year so that they can participate in seminars and lectures arranged by the Department. It may also help the students to study and appear for ICAR tests for award of Junior Fellowships.

It may not be, however, necessary to provide separate courses for Major Field of Specialisation, but the courses could be listed in 400 or 450 series so that these could be taken both at Undergraduate and Postgraduate level.

Again, it may be worthwhile to make provision for students to take additional courses in Basic Sciences and Humanities as well as in agricultural sciences over and above the minimum prescribed. It may enable the talented students to carry more course load and cover more courses to build a good background and make a good preparation for higher studies. When students are to cover 192 credits in 12 trimesters, and if 18 credit hours is the maximum load, they can take in a trimester ($12 \times 18 = 216 - 192 = 24$) they can still cover additional 24 credit hours during their Undergraduate programme. Some of these could be counted for Post-graduate programme.

In Final Year, a few more courses could be provided under Agricultural Extension subject for stay in villages and for participation in agriculture developmental activities. This may greatly help the students to understand the farmers' problems. For this purpose, the Extension has been more concentrated in the last one or two trimesters to offer such courses which have more practical credits. The timings of the village stay could be adjusted to synchronise with the developmental activities. It may be worthwhile if one or two trimesters are provided for placement service.

At Postgraduate level, a greater choice could be provided so that the student could take a few courses not only in agricultural sciences but also in Basic Sciences and Humanities and other sciences depending upon the field of specialisation of the student. Courses in subjects like Statistics, Mathematics, Biochemistry, Chemistry, Physics will be very helpful to the students particularly at Ph.D. level in doing good quality research work.

3. The extent the agriculture education meets the job requirements : The job opportunities exist for self-employment and in services with Government Departments and private firms and corporations. The prospects for self-employment

are brighter now than before. The admission strength could be regulated depending upon the projected demand for trained graduates and opportunities for self-employment. There is a need to diversify the degree programmes in agriculture. It may be necessary to provide for degree programme in the following fields depending upon their scope and availability of funds :

1. Agriculture
2. Horticulture
3. Animal Husbandry
4. Dairy Technology
5. Fisheries
6. Veterinary
7. Agricultural Engineering
8. Sericulture
9. Rural Based Home Science
10. Forestry
11. Agro-Industries
12. Agricultural Cooperation and Marketing
13. Land Resource Administration
14. Agricultural Education and Journalism
15. Agricultural Finance and Administration

The degree programme could be so structured to provide for first one or two years common course work and then branching in subsequent years. The Organisation of Departments should receive more prominence than the concept of College. The Departments naturally have to offer courses to more than one degree programme. Separate Board of Studies could be constituted for different degree programmes, and these Boards could consist of staff of the core Department which operates a particular degree programme.

Diversification may greatly enlarge the job opportunities. For example a degree programme in Agro-industries can prepare the students so that they can get employment in different agro-industries or they may get self-employed by establishing an agro-industrial unit.

Further, it may be worthwhile to provide for offering correspondence courses to on-the-job persons. Such courses could be offered in summer or at other convenient timings. These courses should be more practical-oriented. This sort of opportunities for continuing education may greatly help the persons to improve their efficiency of work. The courses taken in this way could be counted towards any Postgraduate degree programme when in future the person is admitted so that he can finish the work in a short time. This will also help in developing a close liaison with the Graduates working at different places. Again, courses may have to be structured to meet the job requirements and to provide a progressive developmental interest in the work.

4. Opportunities for higher individual accomplishments : The Universities could give special attention to develop certain areas for advanced education and research. This can be done in the areas which are important to the State or region and in which the State or region has a large area under jowar, cotton, ragi and groundnut, it may be worthwhile to build up facilities for advanced training and research on these crops. Specialised courses have to be organised and special facilities built up for advanced research and training. Thus it should be possible to provide good opportunities for talented staff and Post-graduate students to do good quality research and get due recognition from the scientific community and society.

5. Conclusions and summary : The agriculture education has to be in tune with the present condition to prepare the individuals with sufficient knowledge and skill to get employed in different agriculture professions. For this it may be necessary

that the students with agriculture background and those who have passed two years P.U.C. with a good percentage are admitted. The extent of training could extend to four years for all first degree programmes. More stress has to be laid on practical training so that the students get much needed confidence in practical work. Additional courses could be provided so that talented students could take some of these courses to prepare themselves well for advanced training and research. The courses could also be offered for the benefit of employed graduates to provide for continuing education. The diversified degree programmes need to be provided so that there is no undue overcrowding in one or two degree programmes and that new opportunities are provided for getting suitably employed in other professions. Facilities for advanced training and research could be provided in certain crops or areas specially important to the economy of the region so that opportunities are provided for higher individual accomplishment. The agriculture education has to be dynamic and progressive to meet adequately the job requirements.

POSTGRADUATE EDUCATION IN AGRICULTURE

S. V. PATIL*

It was with the establishment of five agricultural colleges in India around 1905 that organised instruction in agriculture at undergraduate level was initiated. Indian Agricultural Research Institute was founded in 1905 in Pusha in Bihar. Around 1936, it was shifted to its present campus at New Delhi. From 1923 to 1958, the Institute used to offer postgraduate training course leading to award of the "Associate-ship". The Institute was given the status of a 'deemed University' under the U.G.C. Act of 1956. The 'Associate-ship' courses were replaced in 1958 by regular PG courses leading to M.Sc. and Ph.D. degrees. In fact the first concrete steps were taken at the Institute towards reorganisation and modernisation of higher education in agriculture in the country. Although around 1930, postgraduate instructions in agriculture were started in some universities in a limited way, it was only after independence some regular PG courses were organised in some universities. The concept of establishment of agricultural university took shape as a result of recommendation of University Education Commission (1948) headed by Dr. Radhakrishnan which recommended specially the setting up of "Rural Universities". The two Joint Indo-American Teams (1955 and 1960) made comparative study of the institutions dealing with agricultural education and research in U.S.A. and India and recommended the pattern of higher education as in Land Grants Colleges in U.S.A. Kothari Commission on Education (1964-66) recommended the establishment of at least one agricultural university in each

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State. At present, there are twentytwo agricultural universities. Practically one in each State and in three States there are more than one. In addition, I.A.R.I., New Delhi, N.D.R.I., Karnal and I.V.R.I., Izatnagar which have the status of deemed University, offer independent postgraduate programmes. The National Commission on Agriculture (1976) has recommended that PG training leading to M.Sc. and Ph.D. degrees should become a distinctive feature of agricultural universities in the country.

During the last two decades, State Agricultural Universities, patterned after the Land Grant College Model of USA, have expanded PG programmes enormously. The expansion has drawn the attention of the ICAR Review Committee (1978) which has observed that the postgraduate programmes have come to be recognised more or less as status symbol to be offered by every college, department and every faculty member. It is in this perspective that we need to examine the role expectation of PG education in agriculture, constraints in its development and avenues for improvement through appropriate corrective measures.

Main features of PG system in Agricultural Universities

Most of the Universities follow either Semester or Trimester with course credit system providing for internal evaluation for courses and external evaluation for thesis. The system of Advisory Committee is provided to guide the students in PG programme. Each student is required to take a few courses in major and related or minor fields, gives a few seminars, undertakes research and submits thesis. In most of the cases, two years of resident requirement for M.Sc., and three years for Ph.D. and time limit of 5 to 6 years for completion is insisted on. The Universities themselves, ICAR and other organisations provide fellowships to merited students for their PG programmes. In some universities, part-time

studentship and graduate assistantship are provided so that the student can work and learn.

Higher agricultural education has to be concerned with the education of qualified men and women who will occupy leading positions in the development of scientific agriculture, shaping agricultural policies and practices, agricultural research, teaching, administration and a wide range of agricultural services. In this context, the content and quality of higher agricultural education will exercise a profound influence on all aspects of agricultural development.

In the context of postgraduate education it is observed that the master's degree programme is designed to help the student to acquire an introduction to the mastery of knowledge in a specified field. The programme of study leading to Ph.D. is designed to prepare a postgraduate student for a life time of creative activity and research. Research training at the doctoral level is expected to be designed so as to develop the innovative capacity of the student for original research, creative thinking and critical analysis. This training is to aim at developing a few committed and creative 'self-starters'.

In general, the main objectives aimed for PG education in agriculture are—(1) to improve the tone of research, teaching and extension activities and indirectly improve the quality of undergraduate programmes; (2) to provide opportunity to the staff to keep themselves abreast of the latest development; and (3) to produce highly qualified persons in the profession to provide leadership in the teaching, research, extension and self-employment.

It is quite obvious that the PG programme stands on a different footing compared to UG programme. The third objective of producing highly qualified persons in the profession to provide leadership really sets the broad qualitative frame for PG education. With these objectives, Agricultural Universities have promoted the development of PG

programmes. There is no doubt that PG programmes have enhanced the quality of academic environment and have promoted the professional growth and have provided trained manpower for the scientific development of agriculture. A large sum of money is being spent on PG programmes by the Agricultural Universities and I.C.A.R. One has to aim to get the best of the huge investment made.

Constraints in PG Programme and Suggestions for Improvement

The academic gains of PG programme do deserve recognition. There is a need for deep introspection whether the PG programmes are closer the accomplishment of which is expected of them. If PG education is not to be considered as a mere extension of undergraduate education, and if inter-disciplinary approach, inculcation of the value of purposeful research, training in modern research methodology, independence in thinking and approach, development of analytical outlook and capacity to draw logical inferences should form core of PG programmes. There are many issues which need to be examined in our endeavour to keep the PG education on the right track. The present paper is not an attempt to unravel the ramifications relating to these issues. However, we need to identify some basic problems facing PG education and to search for corrective measures.

The experience of Indian Agricultural Universities in operating PG programme has been over two decades. These universities have been established in different points of time, started PG programmes not at the same time, and are faced with different levels of resource problems. So the performance and problems of different Agricultural Universities and of different campuses within a given university are bound to vary. However, certain shortcomings and symptoms of deterioration in the quality of PG programmes appear to have

become the concern of all the universities and these are discussed.

1. **Admissions :** In some cases the number of students admitted for PG programme, particularly for M.Sc., in certain subjects is large. In our desire to train more manpower in areas where there is shortage, the admission strength has been enhanced. This causes considerable overcrowding and strain on staff and limited resources available in the Department. At any one centre, however big it may be, it is better not to admit more than 10 students for M.Sc. programme and not more than 5 for Ph.D. programme in each subject. In cases where there is a need to train more number, then it may be necessary to open more centres for PG programmes, rather than increasing the strength at one place. The course-credit system with internal evaluation component is more suited for a limited number of students.

2. **Not attracting the best talented students :** Many good students, because of insecurity of employment, take up employment in all India Competitive services, banks, private organisations and do not come for PG programmes. Even if they join the programme they will be marking time and as soon as they get a job they leave in the middle.

So in many cases those who do not get selected tend to remain to complete the programme. Even those who get the scholarships and fellowships tend to leave. This is because they are keen to get secured employment. This by itself has an adverse effect on the programme, which aims at attracting the best talented students. The State Agricultural Universities, Development Departments and the ICAR may consider selecting the students for employment while they are still in the final year undergraduate class and provide stipends for their PG programmes. Part of the amount being on fellowships

and scholarships could be used for such staff training programme. This, even if it is for small number, may help to retain the most talented students in teaching, research and extension programmes of Universities, ICAR and State Development Departments.

3. Course and course coverage: The PG courses need to be periodically reviewed in the light of latest advancement in frontier of sciences. New courses in the emerging areas need to be added in areas such as Agro-forestry, Bio-technology, Agro-energy, Bio-fertiliser, Agro-chemicals, Agro-meteorology, etc. Repetition in course contents within the departments and between the departments, need to be avoided, as far as possible. Certain courses, the subject matter of which cannot be easily learnt by reading and self study need to be taken during PG programme. It is better that courses in Mathematics, Physics, Chemistry, Statistics, Computer Science, etc., are taken by the students depending upon the need. Such courses need the help of teacher to learn. Descriptive courses and the courses in the same subject, where the student is majoring could be covered by reading and self study. The general tendency of the student is to avoid taking such Basic Science courses, as they require more time to understand and learn. In the plan of course work of the students, it may be ensured that a good number of the courses in Basic Sciences as required are more or less made compulsory. Particularly at Ph.D. level, this is very much essential. For offering such courses, qualified teachers are required in Basic Sciences. In many Agricultural Universities, there is need to develop strong Basic Science Faculty to support the PG programme.

Another aspect that needs to be stressed is that in course coverage instead of merely depending upon lecture notes, it is better that text books or pages of books are prescribed for reading and coverage of portion. Lecture notes could only be supplementary and not as a substitute.

At least 2 to 4 hours reading assignments should form the integrated part of course coverage.

4. **Seminars :** There is a general tendency to assign routine topics for seminars. Many times, it so happens that the old seminar notes are just copied and presented. In that case, the very purpose of giving seminar is not served. It may be necessary to device different types of seminars such as critical examination of the published articles, presentation of hypothesis or new ideas and group discussion on the topics of current interest etc. There should be critical evaluation of the seminar given by the students. All the postgraduate teachers of the Department should be involved in evaluation of the seminar.

5. **Thesis topic :** In selecting a topic for thesis work considerable care needs to be exercised. Many times, it so happens the experiments are planned in a routine way. Research has to be problem-oriented. Problem identification should receive prime consideration. There should be free scope for the students to select the problem. The student may be asked to take even 5 to 6 months to select the problem. The selection of a good problem itself is half research. He should review to identify the gaps in knowledge, visit other centres and discuss with staff, correspond with scientists working in the area at other places. The guide during this preparatory period should help the student to cultivate inquiring mind, crystallise the ideas, develop interest and confidence in tackling the problem. This process, if gone through meticulously, the student will be well set to work on the problem. The problem selected for Ph.D. should be of original type. Lot of creativity, originality and imagination have to be brought to play, so that it can provide high degree of motivation and commitment on the part of the student to do all his best to work on the problem. This is the most finer aspect of the PG programme and

should be fostered for achieving excellence and training high quality scientists with a capacity to tackle even the difficult problems.

Research work need not be confined only to laboratory or field work. It should encompass survey work, laboratory, pot culture, micro-plot, field plot and farmers' field work, as far as possible. The student may visit other centres and may have to stay there for some time to collect data. The reward in terms of accomplishment, and satisfaction for having tackled a problem would no doubt act as an inducement for hard work. The cultivation of this spirit is of paramount importance in Ph.D. thesis research work.

6. Major Advisor : Major Advisor has a key role to play in building student's attitude and competence. He has to spend more time in discussion with the student. He has to be active in research and offer at least one PG course in a year. He should not have more than five students to guide at any one time. Young staff are more active in research and teaching and are in a better position to guide the students. Staff having Ph.D. degree should only be permitted to guide the students. Frequent absence from headquarters by the Major Advisor greatly hampers the PG work and this should be restricted to not more than 4 to 5 days in a month as far as possible.

7. Problem of 'Academic Inbreeding' : In most of the universities, there is considerable 'academic inbreeding.' The students take Bachelor's, Master's and even sometimes Ph.D. degree from the same university and later get employed in the same university itself. It is reported that in the agricultural universities in the country more than 87 per cent of the academic staff belong to the home state and more than 70 per cent of them have obtained their graduate and Master's degree from the home University. This is not good from the point of view of 'cross fertilization of ideas'.

and development of broader outlook. It is high time that certain steps are taken to correct this situation.

Following are the few suggestions :

- i) ICAR may make it obligatory for the recipients of ICAR Fellowships to seek admission in university other than his parent university. In that case each university may reserve at least about twenty five per cent of the seats in PG departments for the students of other universities.
- ii) So also in appointment of staff it is better if each university reserves about twentyfive per cent of the academic staff positions to the persons from other States and other universities.
- iii) Provision should be made for the exchange of academic staff for one or two trimesters/semesters between the two agricultural universities. This may be made more or less obligatory so that staff go to other universities and work at least once in 5 to 6 years on exchange basis. One additional increment may be granted to staff who go and work in other universities. The staff should get regular salary *plus* exchange/deputation allowance.
- iv) The staff may also be encouraged to avail sabatical leave for placement in other universities (including foreign) at the rate of 6 months' leave after 6 years of active service. The staff may be paid, during the leave period their regular salary *plus* fifty per cent travel grants. During placement period, the staff may be permitted to accept any Fellowship or any other assistance of the host university or other organisations.

8. **Liberal Grading :** There is a general tendency to be more liberal in grading at PG level. The teachers are

inclined to give more 'A', a few 'B' and rarely 'C' grades and practically no 'D' and 'F' grades. This is particularly so in grading of seminar and research credits. This is one of the main reasons for the students taking PG programme very lightly and successful completion is taken for granted. This tendency needs to be curbed in order that the students put in their best efforts and work hard to achieve excellence. The grading should be done rationally, giving due recognition and credit to those who do good work as against those who do not put in sincere efforts and come to the mark.

9. Organisation of practicals provided in the course : Proper planning and conduct of practicals is not generally given adequate attention at the PG level. As a result, the time provided for practical class is not properly utilised. In order to make practical exercises more interesting stimulative purposeful, it is better to follow experimental or investigating approach for organising practicals instead of carrying routine work. This means that the student may carry out small laboratory or pot-culture or micro-plot or survey investigations with certain variables and collect data and prepare reports, which could be suitably evaluated.

10. Offering of Diploma Courses in PG Departments : In some departments, Diploma courses of short duration are offered concurrently with PG degree courses. This may not be good as it tends to weaken the main thrust for forward looking and creative PG programme. In case the Diploma courses are required to be offered by the university, they may be offered at other centres, where there is no regular PG programme.

11. PG Correspondence Course : The research scientists who are working in the outlying stations and who are well qualified, may be encouraged to offer PG correspondence courses. For example, a sugarcane scientist working at a

Sugarcane Research Centre may prepare a set of lessons and offer a course on sugarcane through correspondence. For taking PG correspondence courses formal admission to regular PG programme need not to be insisted upon, provided the minimum eligibility requirements are fulfilled. These courses could be taken by inservice candidates working in the university, State Development Departments and private organisations, or when a person is self-employed. The credits for successfully completed correspondence courses could be counted towards PG programme later, when the person is admitted for the regular degree programme. This approach may provide an opportunity for the scientists in the outlying station to participate in the PG programme and also for persons in service or self-employment to devote some time for learning while working.

12. Publication of thesis work : In many cases, it is noticed that thesis research work is not published in scientific journals in time. This may happen either because the work carried out is not worth publishing or the student and guide do not exercise care to write the paper and send for publication. It is better if sending the paper for publication is made more or less as obligation. In fact, before the final *viva-voce* date is fixed, the Major Advisor may ensure that the final draft of the research paper has been prepared by the student in consultation with him and submitted to him. Again in planning and conduct of the research, care needs to be exercised from the beginning that adequate information is gathered systematically and that it can form the basis for publication. It is not that research has to be tuned for publication of paper rather than problem-oriented, but what is required is a systematic approach.

13. Stress on Building School of Thought rather than Centre of Excellence : Few years ago, efforts were made to build up certain centres of Excellence in the Agricultural Universities with the assistance from UNDP. Costly

equipments were procured and additional staff positions were created. It may be worthwhile to give more attention to building up of school of thought around a teacher or a group of workers where good leadership is available and good work is being done. Such scientists need to be identified and given financial and other assistance by the university and ICAR to help them to develop the work of excellence. The scientists may be provided grants to offer a few fellowships to the interested and merited students to come and work with them.

14. Inter-institutional Collaboration : There are number of ICAR, Central and State Government Commodity Boards and public institutions which are carrying out research on various aspects of agriculture. Many of these institutions have good facilities and have qualified scientists working there. Such institutions and the qualified scientists working there should be recognised for PG programme by the Agricultural University located in that State. Such recognition for PG programme should be restricted to the institutions located in that State only. In addition, the agricultural universities should develop collaborative arrangements with as many institutions as possible located within and outside the State for providing facilities for PG students to go and work for short periods.

15. Teacher Evaluation : There has to be some mechanism built in the system for the evaluation of the work of PG teacher. This should be done by Dean/Director of Instruction of Post-graduate Studies. He may prescribe a proforma to check how many lectures and practicals the teacher has conducted, advisory meetings held, the quality of research carried out by the students working with him, etc. Based on the information obtained through the proforma and inspection carried out, the evaluation report should be prepared about the work of the teacher and communicated to the university authorities for record. Regular evaluation is necessary to build up efficiency.

16. Role of PG Dean : Post of Dean/Director of Instruction for PG studies has been provided in most of the universities. There is, however, a general feeling that as Dean/Director of Instruction is provided for every undergraduate college, there is no need to provide separate Dean/Director of Instruction for PG studies. Dean/DI (PGS) has distinctive role to play to see that PG programme in the university is properly organised and conducted, and constant efforts made to improve the academic standards. Although the day-to-day administration is looked after by Dean/DI of the concerned undergraduate college, the matters pertaining to PG admissions, constitution of Inter-disciplinary Advisory Committees, scheduling the offering of the courses, approval of the plan of work and programme of research, appointment of examiners, etc., have to be dealt by the Dean/DI (PGS) to maintain certain degree of uniformity in standards. Formulating regulations governing the PG programme is also the responsibility of PG Dean/Director of Instruction.

17. Shortage of qualified staff and staff positions remaining vacant for a long time : In some universities, there is an acute shortage of qualified staff. Although the availability of qualified staff should be a pre-requisite for starting and continuing the PG programme in a subject, in some areas, it so happens that unless the programme is started with the limited staff available, it is not possible to get the trained staff. In newer areas, the best persons available from the allied areas may have to be grouped for starting the PG programme. In such cases, the university has to send the staff for training to other universities.

There is another problem which is really more serious than that of posts remaining vacant for long time because of administrative delays in recruitment and/or non-availability of suitably qualified staff to fill up the vacancies. In many agricultural universities, about 30-40 per cent of the scientists'

posts have remained unfilled. This situation may further aggravate, unless corrective measures are immediately taken. This is adversely affecting both undergraduate, as well as postgraduate teaching and also research and extension work of the university. The administrative delays in staff recruitment could be avoided, but there is a general shortage of trained manpower in certain disciplines such as Agricultural Engineering, Home Science, Veterinary Science, etc. Even in disciplines of Agricultural Sciences, in subjects such as Agronomy, Soils, Plant Breeding, Horticulture, etc., the shortage of manpower is keenly felt. This may be probably because of great opportunities available for the trained persons to seek better jobs elsewhere. In recent years, the employment opportunities for trained persons have expanded considerably in view of rapid commercialisation of agriculture. This raises a very vital issue whether the agricultural education should be limited to the regular service jobs or more widespread, so that the graduates can seek the newer areas of employment. Education in the field of Engineering has made great strides in recent years, while in the field of agriculture, it is lagging far behind. In a country where 70 per cent of population is engaged in agriculture, naturally the education has to be agriculture-oriented, though not to the 70 per cent of students, to a large number. This would mean that agricultural education component should receive more attention, than what it is at present. Radhakrishnan Commission Report (1948) and Kothari Commission's Report (1964-66) on education have stressed this aspect. So, it is necessary that we think of expanding agricultural education rapidly to help improving agricultural production and generating more employment. No doubt the finance is the main constraint. However, with involvement of farmer's cooperatives, agro-industries, agricultural marketing organisations, etc., it may be possible to build up decentralised rural campuses of the University to serve the agricultural educational needs of the area

Summary and Conclusions

Agricultural Universities in the country have made great stride in the development of PG education. This has greatly helped in generation of suitable agricultural technology and to provide leadership in different areas of development. There are some constraints in the efficient working of the PG programme which need to be corrected, so as to increase the pace of development. Some of these constraints are outlined and possible corrective measures suggested. There is a tremendous scope for application of science and technology for the rapid development of agriculture for increasing production as well as for generating more gainful employment. More widespread higher education in agriculture may provide probably the most powerful tool for exploiting the enormous agriculture potential the country has. Involvement of farmers organisations, agro-industries and agricultural marketing committees in building up of decentralised small agricultural university campuses in the rural areas needs to be explored for expending higher education in agriculture to meet the growing demand for trained manpower.

INTERNAL EVALUATION IN THE AGRICULTURAL UNIVERSITY

S. V. PATIL*

Internal evaluation is one of the significant features of the agricultural universities in India. The internal evaluation is comprehensive and continuous. Evidence is obtained by direct contact about students' abilities, learning of the subject, diligence and interest. In internal evaluation, the final grade is based on a number of tests, examinations, oral reports, assignments and practical work. The student comes to know of his performance in each test within few days. In internal evaluation, a certain percentage of marks is allotted for attendance and this exercises a healthy influence on the study habits of students. The system enables the teacher to come in greater contact with the student. It enables him to help the student to utilise his talents, time and learning facilities to a fuller extent. Thus the student can be guided, induced and stimulated to learn the subject more effectively and show his best. It is now well recognised that evaluation is an essential part of the teaching process and it has to be used as an effective tool in motivating and directing learning.

The traditional system of evaluation consisting of generally one examination with external evaluation at the end of the academic year has been the subject of much criticism. Under the traditional systems, testing is considered as a terminal action rather as means for guiding in learning. The

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harmful effect of the external evaluation on teaching and broader educational aims of universities is now well understood. A few advantages of the system are more than outweighed by its many shortcomings.

Considering that the advantages of the internal evaluation are many, the system has been introduced in many of the agricultural universities in India. The system has been in operation for some time in many agricultural universities and it may be worthwhile to take stock of the situation, examine the difficulties and shortcomings and evolve the steps that can be taken to overcome these difficulties. Some of the difficulties commonly raised are discussed below :

Tests and Examinations

In the internal evaluation system generally 5 to 6 examinations are taken. This may include 2 to 3 tests (announced and unannounced) and interim, mid-term and final examinations in addition to assignments and practical examinations. When a student is taking 5 to 6 courses in a trimester, he may have to take 25 to 40 tests during the period of about 15 weeks. The criticism levelled is when there are so many examinations, the student cannot spend sufficient time to refer to the books and understand the subjects. There may be some truth in this. But there is another side of the picture. When there is one examination at the end of the year, most of the students do not study from the beginning and study only during the last few months before the examination. To mitigate, precisely, this situation and induce the students to utilise their time more fully for study, internal evaluation has been introduced in agricultural universities. It has been the general experience that it takes a little time for the students coming from the traditional system to get used to the new system. When the student is regular in his studies and deeply involved in the process of learning and when he is

coming into close contact with the teacher, giving a test becomes a routine affair and may provide the needed stimulus in the process of learning.

Further, the success of internal evaluation depends a great deal upon the teacher. The tests, assignments and practical exercises have to be formulated in such a way that they do not unduly tax his mind but help in developing the students' ability to think, interpret and analyse the principles, crystallise the ideas and acquire the skills. Again, the examination bugbear, common to the traditional system, will be absent, as his final grade is not judged by one examination but by many during the trimester. In the internal evaluation system, the teacher holds a pivotal position and frequent seminars, discussions, orientation training programme will greatly help to improve the system.

Problems in Grading

'Grading cannot be fair' is the common criticism levelled against internal evaluation system. In this system the teacher offering the course is expected to set the paper, correct the answer books, discuss in the class the model answers and return the answer books to the students within a few days after the examination is over. As the students get back the answer books, they get the opportunities to compare their answers with others and in the case of any discrepancy, they can immediately contact the teachers and get it rectified. This arrangement by itself has a moderating effect on the evaluation made by the teacher.

Sometimes, certain serious allegations are made against the teachers such as the questions are earlier revealed to some students, and even the answer papers are changed later. As we have already noted the success of the internal evaluation depends mainly on the teacher. It is essential that highly qualified and learned persons are appointed as teachers in the

university. It is necessary that only those who are in the cadre of assistant professors and above are allowed to handle the classes. Further some of the measures which can be adopted depending upon the situation are given below :

a) **Recognition for good teachers :** This is an administrative action with the help of a system of rating of the teacher by the students, the Director of Instruction and the Dean. The rating can be done once in few years and the teacher adjudged as good should be given due recognition in the form of higher pay, awards and promotions. In the rating of the teacher, an elaborate procedure needs to be followed and considerable care has to be taken to really identify a good teacher and not to stifle the enthusiasm of the teacher in his work. The following are some of the points which can be taken into consideration in rating the teacher. Knowledge and understanding of the subject, academic achievements, teacher-student relationship, general education, performance in teaching, interest and motivation created amongst the students in learning the subject, personal traits, emotional adjustments, sincerity and a sense of dedication to the profession.

The rating forms can be prepared and information obtained from the concerned persons. When such a system is introduced, it may have a salutary effect on the teachers and may greatly promote fairness in grading.

The teacher can also arrange to evaluate effectiveness of his own teaching by giving a questionnaire and getting the remarks from the students at the end of the course. This may enable the teacher to become aware of his own short comings and take steps to improve his teaching.

b) **Incentives :** Much remains to be done in this area. Besides better pay scales, opportunities have to be provided for the teacher to do research, attend seminars and visit other

institutions. He could be permitted to attend at least one annual meeting of the professional societies. He has to be involved in high level committees at the university government and other institutional levels in taking certain policy decisions. He can be included in delegations, teams and commissions at state and national levels. A teacher should have one trimester free from teaching to concentrate on research to visit other institutions, attend training programmes and bring his notes up-to-date. This all will help in creating confidence in his work. Further, senior teacher and professors should handle at least one undergraduate course during the year and not only confine themselves to postgraduate teaching.

c) **Regulated teaching load :** The teacher needs considerable time to prepare lectures and practical exercises, conduct assignments, and meet the students to solve their difficulties. Under the internal evaluation system, it is expected that the teacher taking theory classes also attends to practical classes where practicals are provided for the course. The norms for teaching load have been fixed from time to time. In addition to actual contact hours the following items have to be considered in determining the teaching load. Number of students in each class, number of different subjects taught, teaching for graduates or undergraduates, number of lectures and practicals per day. When the class strength is more than 50, the teacher can be entrusted with only one course covering 3 to 4 credits during the trimester.

d) **Providing a Cell for Institutional Research :** A cell for institutional research for every college of the university may greatly help the concerned Director of Instruction or Dean to keep a close watch and take suitable action to check malpractices. The student ledger type records pertaining to date of entrance, grades, date of termination could be supplemented by a cumulative record and folder type

information about the student. This information could include his previous performance in his academic and extra-curricular activities, school attended, course taken, grades obtained, distinctions won, leave taken etc.

Difficulty in maintaining standards

Some agricultural universities have more than one agricultural college and they are located at different campuses in the state. In such cases, the teacher offering the course in a subject will not be the same at the different colleges, and this is bound to lead to some variation in the standard of teaching and grading. For admission of postgraduate courses and for employment when common selections are made, this really creates a problem. There will be unhealthy competition among the teachers to give more liberal grades to help their students. This difficulty can be got over to a great extent by providing one head of the department in charge of teaching the subject in all the constituent colleges. He can review the work periodically and see that some uniformity in the proportion of different grades is maintained. Further when selections are made for postgraduate courses, a certain percentage of marks can be set aside for the common entrance examination and interview in addition to the marks scored in the subjects at the college.

Problems of malpractices

Generally tests are conducted by the teachers in the regular class hours in the classroom. If the classrooms are small and seats are limited, the students sitting close to each other can easily see the answer papers of other students. Further, when the tests are of objective type, requiring one word, ticking off or writing short answers, copying is more common. By some signs, the students convey the answers. Under such circumstances, it is difficult to check copying. Chairs with desk like arrangements for writing need to be

provided in the classrooms to prevent copying. Again, the classrooms have to be of a bigger size so that when the tests are taken, the students can spread apart the chairs and sit. More than one teacher would be necessary for supervision, when the number of students in the class is larger. Further, much depends upon the way the tests are conducted. The teacher by skillful organisation of test questions and marking of answers can certainly check the copying tendency.

There is also a problem of leakage of question papers when the typing and cyclostyling have got to be done at a common place in the college. It may be necessary to provide typing facilities in each department. If the departments are small, such facility can be provided for 2 to 3 departments, still, however, the teacher has to exercise considerable care and take all the necessary precautions to prevent any leakage of question papers, as he alone can be responsible for any leakage of questions.

Conclusions

The internal evaluation systems has been evolved largely in recent decades arising from a newer philosophy of education. The recent philosophy of education emphasises the responsibility of the teacher not only for the development of concepts, information, skills and habits, but also for the stimulation of the student's growth in attitude, appreciation, interests and power of thinking. With introduction of the internal evaluation system in agricultural universities, a progressive step has been taken. A constant evaluation of the programme is however essential in order to provide for quick improvements, adjustments and innovations.

PROMOTION OF ACADEMIC LEADERSHIP IN AGRICULTURAL UNIVERSITIES

S. V. PATIL*

The World Association of Universities has coined the definition of the University as "an institution whose main purpose is education and extension of knowledge through research and which grants academic degrees". University is a place of higher learning. The University of Agricultural Sciences has been established for the development of agriculture, animal husbandry and allied sciences in the state of Mysore. The University is vested with tripartite function of teaching, research and extension. The main mission of the University therefore is to offer instruction at all levels of higher education, create new scientific knowledge in every branch of agricultural sciences and disseminate it for the solution of many problems confronting the development of agriculture. In order to carry on these functions, the University has built up the organisation consisting of men and materials depending upon the availability of resources.

The main functionaries in the University are teachers and research and extension workers. The department is an important basic unit of organisation in the University. It is established to carry the programmes in a particular field of knowledge. The functionaries, depending upon their field of knowledge are located in the departments. All the other staff at the university are meant to provide facilities and assist the

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functionaries in their work. The administration is carried out with a set of rules and regulations and with concern for the people who staff the organisation to promote efficiency and economy in implementing the functional responsibilities. The administrative lines of responsibility are basic to any organisational structure. The rules framed and procedures adopted are mostly based on the tradition, past experience and study of instruments of innovations. This is an evolutionary process, and modifications are effected from time to time to meet the changing situations so as to build up efficient administrative procedures for progress.

Decision making is a core ingredient of administration. It is diffused through the various levels of hierarchy of the University. The bulk of the decisions are performed at the departmental level. Certain important and generalised decisions are made at committee levels, and at upper levels of hierarchy. While at higher levels there may be fewer decisions to make, the impact of these decisions are far reaching than those made at lower levels.

There are University staff who approach their work with dedication and interest; others take it as routine duty to perform to get their salary. So some direction and incentive is necessary to enable the teacher to see his compelling role. One of the main functions of the administration in the University therefore is to review periodically the working of the department and take suitable action to bring about improvement in the work turned out with a minimum economic wastage and maximum utilisation of human talent. The following are some of the procedures followed for the purpose by the University of Agricultural Sciences:

- i) Visits to the department and discussion with staff.
- ii) Office inspection of the staff once in a year.
- iii) Preparation of evaluation reports of the staff once in a year by the concerned officer.

- iv) Evaluation of teachers by the committee consisting of Director of Instruction and Dean as Chairman.
- v) Evaluation of the work of the staff by the committee for the purpose of merit promotion.

The above procedures greatly help to know the work carried out by the staff and the problems that inhibit their performance. It provides an opportunity to appreciate the good work done and to recommend for suitable incentives for further improvement. The shortcomings of the staff can also be brought to the notice of the staff for early correction.

1. Improvement in the academic qualities of the staff : The improvement in academic qualities of the staff can be brought about by the following :

- a) Recruiting high quality staff,
- b) Providing suitable opportunities for self-improvement and creating suitable environment and innovative climate for work.

a) Recruiting high quality staff : It is said that University is no better than its teachers. Scholarship is essential both to teaching and research. The combination of imagination, originality and hard work is found in the contributions of superior faculty personnel. Good staff has 'multiplier' effect and is vital for the progress of the University. Academic qualifications, experience in specialised field, success achieved in the profession, productive research work as evidenced by the quality of papers published and personal reputation in the eyes of fellow scientists and students are some of the criteria to judge the merit of staff for selection. Seniority although has the virtue of including the valuable ingredient, of experience, cannot be the sole criterion for selection of staff at the University. The University of Agricultural Sciences is adopting a system of selection of staff for every rank through selection

committees specially constituted for the purpose. The posts are advertised giving details about the qualifications required. The qualifications for the posts are decided in the Academic Council. The University has adopted attractive salary scales for all the teaching, research and extension posts. Thus the procedure of selection has the necessary tenets for selection of competent staff for the University.

The following are the other points that need consideration in staff recruitment :

- i) *For each department important fields of specialisation can be determined* and recruitment made to take care of such fields of specialisation. Knowledge in each subject has grown too large to be comprehended by a single mind. Specialisation therefore is inevitable and will increase the efficiency of teaching and research.
- ii) In the trimester system, there is internal evaluation. Evaluation is an essential part in a teaching process. Internal evaluation is comprehensive and has to be used as an effective tool in motivating the student to be regular and diligent and learn his subject well. The instructors do not handle the theory classes. *Whether the posts of Instructors can be reduced or even abolished and whether the posts of Assistant Professors and Associate Professors can be proportionately increased* needs consideration. Graduate teaching and research assistants however could be appointed on tenure basis on fixed pay to assist the Professor and the Associate Professor in teaching. For such posts, postgraduate students of the division can be appointed.
- iii) *Greater involvement of the departmental staff for the selection of persons* to the posts in the department can be considered. The desire of the staff to promote

their professional interest and improve the standing and prestige of the department may act as a compelling force to view the selection in more objective manner.

- iv) *A few posts of visiting professors can be provided, so that persons from other Universities in India and abroad can be invited to come and work in the University for a short period of time. This may greatly help in building up the department and in creating new lines of specialisation. The visiting professors may truly act as instigators of change and improvement. This will also help to a great extent to overcome the problem of 'in breeding'.*

b) Providing suitable opportunities for self-improvement and suitable environment and innovative climate for work: The University is considered primarily as the organisation of scholars. The creative, thoughtful and mature minds can greatly influence the active and plastic minds of young students. Informed and enlightened mind has heightened capacities both to know and work towards the good. The University is a place where the staff has to know their subject well and keep abreast with recent developments in their field. They aspire to search for truth, take an open view for critical enquiry with considerable degree of detachment. The pursuit of truth in itself is regarded as the highest activity of man. Academic freedom is essential to enable the teachers to protect their right to think freely and guard their creative potentialities and do their work with integrity, zeal, dedication and responsibility. The demand for new knowledge is inexhaustible. A teacher can be more effective if he is constantly learning and acquiring new knowledge and skills through self-study and attending to training programmes. It is truly said that a lamp can never light another lamp unless it continues to burn. Opportunity to do research is another factor that may stimulate great efforts for self-study. It is said

that in the University, teaching and research are indeed the two ends of the same bow and neither has much force without the other. Effective teachers are those who are also active in the research for new knowledge and deepened insights. The teaching and research produce a favourable interaction effect that cannot be ordinarily achieved by either separately. In the University of Agricultural Sciences every teacher is expected to do some research. This approach has provided unique opportunity for the teachers to improve their academic qualities. Further a good number of staff are regularly deputed for higher training under some assistance or the other. Many of the staff members of the University have received advanced training in Land Grant Colleges and other Universities in USA, Great Britain, Canada, Australia, France under U.S.A.I., Rockefeller and Ford Foundations and Technical Cooperation Programmes. A good number have also received training at IARI and other advanced centres of training in India. Summer schools are also organised at all India level for the in-service training of staff.

In this regard, the following are the other measures that could be considered :

- i) *Granting of six months sabbatical leave* with full pay and part of the travel expenses after four years of service for Professors and Assoc. Professors to go and work at other Universities, institutions in India or abroad. This will greatly help the staff to gain valuable experience and facilitate self-renewal.
- ii) *Organising of seminars in the department.* Each staff member, whether working in teaching, research or extension in the discipline, can be invited to give a talk on the topic in his own line of specialisation at least once in a year. Seminars help to conceptualize ideas, develop intellectual skill and attitudes and test

the validity of one's own opinion. They act as compelling force to stimulate deep study and learning.

- iii) *Provision for the staff to attend one scientific society meeting* at all India or regional level provided at least one paper is presented. Attending of such meeting helps the staff to know the co-specialists in one's own discipline and exchange ideas. Reading of paper and active participation in the discussion enable the staff to gain greater academic confidence and maturity.
- iv) *Development of departmental libraries* : The departmental library could be a supplement and not a substitute for the main library. One copy of the text book and reference book very often required for the staff and graduate students for reference could be kept in the department. The seminar notes, theses of the postgraduate students, papers presented at the professional meetings, University reports and bulletins, and reprints of the papers obtained through requests could all be kept in the department suitably classified at a convenient place. Some staff members may also like to keep their personal books and other collections so that they are readily available for reference to postgraduate students and staff. For building up of the departmental library more than finance, considerable efforts on the part of the individual staff members is required.
- v) *Individual room for the staff* : Individual room for each staff member will provide favourable environment for study and work. The existing sitting space could be suitably remodelled by providing wooden partition.

2. Improvement of leadership potentialities of the staff:
The University is basically a multi-discipline institution

manned by staff who are specialists in their own field. As such the University is an academic fellowship of equals. The University is a place where the staff is concerned with acquisition of knowledge, creation of new ideas and knowledge and communicating the knowledge so accumulated to the students in particular and public at large. They are there to provide the society with competent men and women trained in different professions and imbued with sense of social purpose. The atmosphere to explore, change to seek a better way has to flourish in the University. Leadership is defined as 'the group of persons who are actively engaged in the formulation of the doctrine and programme of institution and who direct its operation in relationship with environment'. Some of the factors that may help the leadership potentialities of staff are given below :

a) *Sharing in making of professional decisions* : The staff of the department can be associated in planning for course curriculum, research programme, in preparing budget estimates, in making recommendations for library books, and periodicals and in planning for the development of the department. Such matters can be discussed in the staff meetings and consensus of opinion taken for taking the decision. Greater opportunities for the staff for participation in specialised committees of the universities and for the statement of views exercising one's own initiative may help in encouraging the leadership potentialities of the staff.

b) *Participation in postgraduate programme* : The persons who are qualified and experienced, whether they are working in teaching, research or extension, could be involved in postgraduate teaching programme. They could offer courses in their own field of specialisation and serve on advisory committee of the students. Contact with young and talented mind striving hard for acquisition of knowledge and attaining excellence in the work may greatly stimulate the leadership potentialities of the staff.

c) *Arrangements for publishing technical papers and bulletins on the research projects completed*: Writing a paper or bulletin is an exercise on conceptualisation of ideas, clarify of thinking, critical analysis of the data and honest search to establish theories and principles and in drawing logical conclusions that can stand the test of time. It is a creative art and a powerful force in conveying ideas and in influencing the course of future developments. The staff can be encouraged to write papers or bulletins for publication as soon as their research work is completed. Adequate funds and arrangements to get them published very early will be helpful in enhancing the prestige of the staff in the eyes of other co-workers. The funds for publication of bulletins can be even provided in the project itself.

d) *Recognition of good work done*: The university has already made arrangements for merit promotion. State awards are also given to outstanding workers. Giving of advanced increments for research bulletins, books and laboratory manuals published, new instruments or techniques developed and new varieties or practices evolved can also be considered. Further, public recognition can be developed by bringing to the attention of the public the good work turned out by the individuals in the university.

e) *Proper environment*: There has to be an atmosphere most conducive to speculation, experimentation and creation. Such environment emerge out of scholarship of the staff, genuine interest and support from the non-technical staff, confidence reposed by administrative authorities, gentle persuasion and enforcement of discipline to preserve certain values and standards and physical facilities for work. The creation of congenial atmosphere in the department and in the university at large is a cooperative effort and every individual has a role and an opportunity to play in this direction.

Conclusions

The academic staff in the university are the persons who carry on the main functions of the university. The success and future expansion of the university depend primarily on the quality and quantity of work turned out by the academic staff. The sense of belonging and identification of self interest with the general interest of the university are of vital concern to the growth of the university. In this paper an attempt has been made to bring out for discussion only a few important and relevant points that may help in improving the academic staff qualities and leadership potentialities of the staff.

NEW COURSES AND CURRICULA IN AGRICULTURE

S. V. PATIL *

India may continue to be for at least two to three more decades mainly as an agricultural country with about 60 to 70 per cent of population still depending on it. Nearly 80 per cent of our people live in rural areas and about 50 per cent of them suffer from the worst kind of poverty. As population increases the number living in rural areas may increase despite the fact that migration to cities has been on the increase. The large scale creation and transfer of appropriate technology to suit the rural areas to solve the urgent problems of production and poverty is therefore a challenging task for the scientists and administrators in the country.

Education is powerful tool in national development. In the present national scene, agricultural education assumes considerable importance. Agricultural Universities with the basic concept of integration of teaching, research and extension are making significant contribution to the improvement of agriculture in the country. Increasing the pace of development of agriculture and other associated rural industries can vastly expand employment opportunities and can promote faster economic growth. New courses and curricula need to be provided to make agricultural education more relevant to developmental needs of the country. In structuring new courses the following are the important aspects that need to be considered.

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1. Rural bias to agricultural education
2. Diversification of agricultural education
3. Work experience
4. Providing for experimentation and innovation
5. Continuing education.

1. **Rural bias to agricultural education :** There is often a criticism that the agricultural education now provided does not adequately help in the development of skills and attitudes suited to rural development. Development of appropriate technology needs a good understanding of the real situations in the rural areas. A few courses on work in the villages should be provided in the regular degree programme. These courses could be offered by the Agricultural Extension Department. The students can stay for about a trimester in the village and work with a farmer or group of farmers and participate in agricultural production programmes. For these courses also regular evaluation should be carried out and grades given. These courses offered during the degree programme appear to be more effective than offering at the end of the programme.

2. **Diversification of agricultural education :** Diversification of agricultural education may greatly enlarge the job opportunities. It may help to avoid undue overcrowding of students in one or two degree programmes. Diversification may increase the degree of specialization. With few subjects covered in-depth, it may be possible to provide adequate credits for work experience, village stay and placement service, etc. The diversified degree programmes could be so structured that the first one or two years are common and then there is branching in subsequent years. The Agricultural Universities may offer the degree programmes in the following fields depending upon the need of the area and availability of funds.

- i) Agriculture
- ii) Horticulture
- iii) Veterinary
- iv) Animal Husbandry and Dairy Science
- v) Fisheries
- vi) Sericulture
- vii) Agricultural Engineering
- viii) Forestry
- ix) Agricultural Cooperation and Marketing
- x) Rural Industries
- xi) Land and Water Resource Development (to cover land/legislation, consolidation assessment, ground water technology etc.)
- xii) Agricultural Education and Journalism
- xiii) Agricultural Finance and Administration
- xiv) Food Technology
- xv) Agriculture Product Technology (to cover cotton, wool, fibre, tobacco, leather, wood, oil, sugar, technology).
- xvi) Rural based Home Science.

The diversity within the campus is an inescapable necessity for inter-disciplinary cooperation and work in tackling the complex problems. When more than one degree programmes are offered on a campus, the organization of the department should receive a greater prominence than the concept of the college. A department naturally may have to offer courses to more than one degree programme. Such an integrated teaching programme may greatly reduce the overall cost of training.

3. Work experience: In agricultural education, work experience may greatly help to develop skills and attitude

suited for future employment. The academic work and work experience need to be harmoniously combined so that more beneficial interaction effect is obtained. The programme of work experience has to be forward looking and has to be developed carefully as a corrective to more academic character of education. The work experience should intermingle with academic work. It has to be, as far as possible integrated with the concerned subject matter. There has to be regular evaluation as is done for other courses. In many universities, the work experience now provided is too limited in extent and scope. This could be further expanded so that the students not only gain practical experience and confidence for self employment, but also would be able to earn some money while they learn. Raising of crops, nursery work, management of animals and poultry for a period of few months, rearing of silkworms, fishing etc., could provide work experience for different degree programmes. About 6 to 8 credits of practical work should be provided for such purposes, spread over 2 to 3 years of the degree programme. The system has to be built up in such a manner that each student is responsible for the timely attendance and good quality of work. For example, for agriculture degree programme a plot of 1/20 to 1/10 of hectare could be allotted to each student for 2 to 3 years of the degree programme so that the student can carry on most of the crop production operations himself during the practical hours and also during his spare time. The necessary inputs should be provided by the University and cost later deducted from his income from the plot. The student should be allowed to retain the net profit earned so that it will act as good incentive. Adequate facilities in terms of land, equipment, irrigation water etc., need to be built up so that the student can conveniently handle the work and earn a fairly good income. Such work experience may promote good work habits and general ability to organize work. It deepens the understanding of theoretical learning and equip the student well for self-reliance.

4. Providing for experimentation and innovation : In the system of agricultural education even at the undergraduate level, it may be necessary to provide opportunities to cultivate the spirit of speculation, experimentation and creation. There is a general criticism that at undergraduate level the students mainly depend upon class notes and do not undertake much of outside reading to broaden their horizon of understanding so conducive for speculation and experimentation. In the overall system of undergraduate education the following courses may be of some help :

- a) Term paper course
- b) Course of recent advances and experimental techniques.

It may be worthwhile to provide 3 to 4 credits for term paper at the undergraduate level. One credit could be taken at a time for 3 to 4 times during the degree programme. These courses should be provided in a few selected applied science subjects. Each student should be allotted a different topic. He should conceptualise ideas, do library work, write the paper and later present it to group of students and staff. Regular evaluation could be done as is done for other courses.

For recent advances and experimental technique, 1 to 2 courses covering about 3 to 6 credits could be offered under Major Field of Specialization. These courses should be in the final year of undergraduate programme. The students may take these course in any one or two subjects of their choice as major and elective courses. As part of these courses the student may take one small problem, do survey, review or conduct an experiment and prepare a paper. This may provide an opportunity for creative thinking and introduce the student to the field of experimentation and reasoning.

5. Providing for continuing education : The system of continuing education may greatly help in updating the

graduates who are in service and self-employment. Course on new areas, recent advances and bridging courses could be offered during long trimester breaks. The employed persons could take leave for a short period and spend some useful time at the University. In addition to on the campus courses, correspondence courses would be useful to allow the employed graduates to take courses by stages and with intervals depending on their convenience. This may also enable the staff to be in close touch with field workers and field problems. Regular evaluation could be carried on for these courses also as is done for other courses. Some of these courses could be even counted towards postgraduate degree programme as and when the person is admitted to the programme. Alternative work with learning or combining work with learning may greatly help to promote the habit of study, progressive outlook and the desire to achieve excellence.

Summary

There is a need to relate agricultural education more effectively to developmental and occupational needs. New courses on village stay and work experience may enlarge the scope of self employment and improve the job efficiency and thus may help greater application of science and technology to increase agricultural production. Diversification of agricultural education to provide for more degree programmes in areas not now adequately covered at present may bring about greater degree of specialisation and creation of appropriate technology. Courses on term paper, recent advances and experimental techniques at undergraduate level may promote habits of study and critical analysis and cultivation of the spirit of experimentation and scientific reasoning. On the campus and correspondence courses for the benefit of employed graduates may provide a system of continuing education to enable one to develop regular study habits and keep oneself abreast with the development of new technology.

AGRICULTURAL EDUCATION AND RESEARCH IN HUNGARY*

S. V. PATIL**

Hungary, a socialist state is geographically situated in the centre of Europe in the Danube river basin. It has a common border with Czechoslovakia. Yugoslavia, Romania, Austria and Soviet Union, with a population of 10.5 million. About half the population lives in towns and the other half, in villages and farms. Twenty five years ago, agriculture accounted for about half of the total national income with industry accounting for only one third. Today agriculture produces one-sixth and industry about half of total national income. Wheat, maize, barley, potatoes and grapes are the important crops grown in the country. Eight years of basic education up to the age of about 14 years is compulsory. Agriculture education is provided from middle school level as shown in Fig. 1 to meet the demand for skilled workers, technicians, farm leaders and managers, teachers and scientific research workers.

1. Vocational Agricultural Schools : There are about 70 vocational agricultural schools in the country, training skilled workers. After eight years of basic schooling the students are admitted to these schools for a three years course. About 5000 students are admitted every year to these schools, which offer a wide range of courses, depending upon local

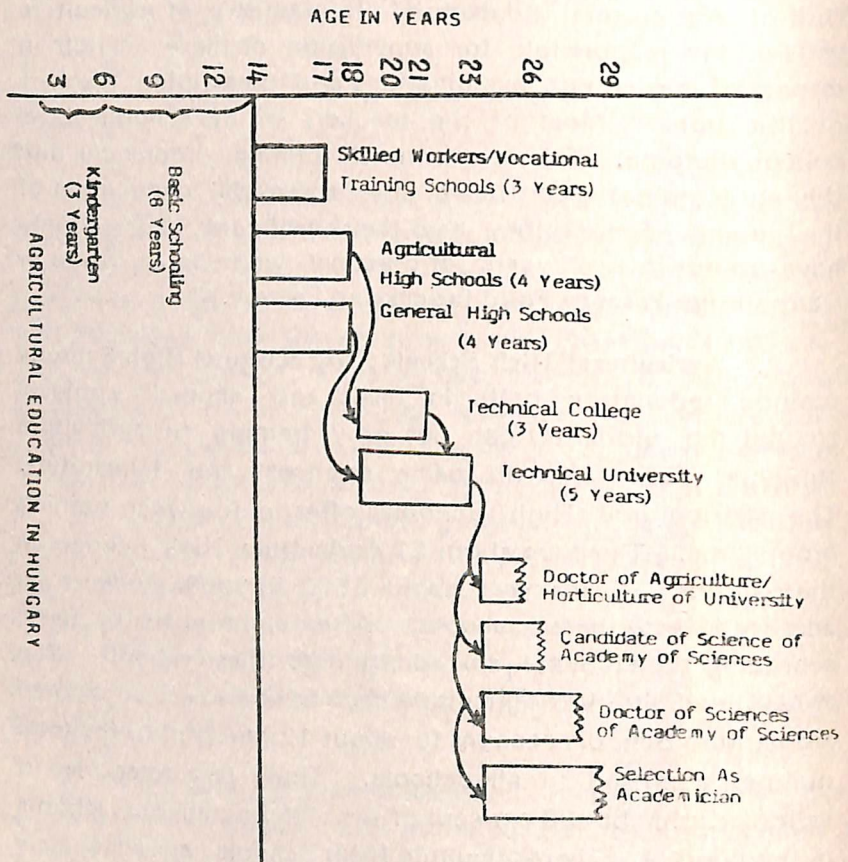
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needs. The courses are more practical-oriented to prepare the students for skilled work. Most of the schools belong to Local Councils and some to the Government. The Supervisory Unit of Agricultural Education in the Ministry of Agriculture and Food is responsible for supervision of these schools in respect of curriculum, examinations and prescribing teachers qualifications. Most of the teachers of the schools hold college diploma. This is a terminal training programme and the students get a certificate after successful completion of the course. Before they earn their certificate, the students have to put in two years of practical work in a State or Cooperative Farm or Food Processing Factory.

2. Agricultural High Schools : Agricultural High Schools provide education both in basic and applied subjects so that the students get not only training in agriculture subjects, but also in basic sciences and humanities. The Agricultural High Schools offer a four-year training programme. There are about 61 Agricultural High Schools in the country. Every year about 1500 to 3000 students are admitted into these schools. After eight years of basic schooling the students are admitted to these schools. The students admitted to Agriculture High Schools and Vocational Agriculture Schools account for about 12 per cent of the total number admitted to all schools. These two categories of schools form about 8 per cent of the total number of schools in the country. The Agriculture High Schools are adequately equipped with good buildings and instructional facilities. Out of the total students strength in these schools, about 50 per cent are girl students. The Agriculture High Schools offer a wide range of courses covering agriculture, horticulture, animal science, forestry, wine making, freezing and canning. The supervision of the Agriculture High Schools again rests with the Supervisory Unit of Agricultural Education of Ministry of Agriculture and Food. The teachers employed in these High

Schools have to have a two-year teachers training diploma in addition to their college diploma.



3. Technical Colleges : The Colleges of Agriculture, Horticulture, Animal Breeding, Production and Feed, Farm Mechanization, Food Technology etc., have been established in different areas depending upon local needs. The Colleges offer 3 years training programme leading to a diploma. The students who have successfully completed four years of schooling in Agriculture High Schools are admitted to these

college. Every year about 1700 students are admitted to these colleges. The semester system is generally followed. The curriculum includes basic and applied sciences, humanities, political economy, scientific socialism, physical education, military science and sports. There is rush for admission to these colleges. The number of applications received is nearly four times the number admitted. There is an entrance examination for admission. These colleges belong to the Ministry of Agriculture and Food. The students graduating from these colleges are called Engineers (even though they may be in agricultural science). The graduates of the college are taken on employment on State and Cooperative Farms as Leaders of group of workers.

4. University Education : Hungary has three Agricultural Universities, one Horticultural University, one Veterinary University and one Forestry University. The training period in all these Universities is five years. The students who have successfully completed 12 years of general schooling, are admitted to these universities, Hungary has the reputation of having some of the oldest Agriculture, Horticulture and Veterinary Colleges (now Universities) in the world. The first independent College of Agriculture of the world was established at Keszthely in Hungary in 1797. A separate school of Horticulture, the predecessor of the present University of Horticulture at Budapest was established as early as in 1853. The Veterinary School, the predecessor of the present University of Veterinary Science at Budapest was started in 1787.

The Universities offer both regular and correspondence courses. The regular course covers five years while the duration of correspondence course is six years. A minimum of two years of practical work experience is needed for admission to any correspondence course in the University. The students of correspondence course have to come to the University for at least a few weeks for taking lectures, practicals and to appear for examinations. The students who have completed

college course, are also sometimes admitted to a three years correspondence course for completion of university diploma. In addition to regular University examinations, the students have to take State Examination to earn University diploma. In the framework of State Examination, the students have to prepare a diploma project thesis and appear for oral examination. The University graduates are mostly employed in the Universities, Research Institutes as teachers and research scientists and in State and Cooperative farms in planning sections.

5. Postgraduate Education : The following form of postgraduate education is provided in Hungary.

(a) *Short duration Postgraduate training :* The object of short duration postgraduate training for a period of 1 to 4 weeks is to acquaint the qualified and employed graduates with the recent developments in science and technology. A wide range of courses are yearly announced and offered depending upon the demands of national economy. This postgraduate training is coordinated by the independent Institute for Postgraduate Training under the Ministry of Agriculture and Food. The graduates having two years of experience, are admitted to this training programme. Each University offers this training depending upon the facilities available.

b) *Training in specialised fields :* More intensive training in specialised field is provided for a period of 1 to 2 years. This training is given in the form of correspondence courses. The students may have to spend at least a few weeks at the University with the rest of the training covered by correspondence. There is a final State Examination. The persons successfully completing the course are awarded diploma indicating their specialised fields.

3. University Doctor's Degree : The Universities are empowered to award the degree of Doctor of Agriculture or

Horticulture or Forestry as the case may be. The University diploma holders are eligible for this degree. The applicants have to prepare a doctor's dissertation and pass the prescribed examination. The dissertation is defended before the appropriate committee of the University. Usually more than two years time is required to carry out research and prepare the thesis.

4. Candidate's Degree : This degree is awarded by the Hungarian Academy of Sciences. The Degree Granting Board of the Academy is the national organization incharge of scientist training. Outstanding professors in the Universities and Research Scientists working at Research Centres of Hungarian Academy of Sciences and those working in Research Institutes of the Ministry of Agriculture and Food are recognized to act as guides. The aspirant has to work on a problem, carryout original research work and prepare a thesis. Ordinarily more than 2 to 3 years time is required to prepare a quality thesis. The thesis has to be defended before a Committee appointed by the Academy of Sciences. On successful completion of the requirement, the Postgraduate Degree Granting Board of the Academy may recognise the person as Candidate of Science.

5. Doctor of Science of Academy : This degree is awarded by the Postgraduate Degree Granting Board of the Hungarian Academy of Sciences based on outstanding research work carriedout by the person as evidenced by the quality of research papers published. Ordinarily more than 10 years of research work needs to be carried out so that a good number of quality research papers are published in the specialised field.

6. Selection as Academician : This is a rare distinction conferred on an eminent scientist. The person who has done outstanding research work and has contributed a great deal towards the advancement of science is elected as Academician

by the members of the Hungarian Academy of Sciences. The Academicians are greatly respected by the scientific community and as members of Academy they promote the development of science in the country.

Agricultural Research

The agricultural research work is conducted at Research Centres of Academy of Sciences, Research Institutions of Ministry of Agriculture and Food, Universities and Colleges. At Colleges and Universities, the research work is carried out by the teaching staff as disciplinary research and contract research. The disciplinary research is carried out depending upon the money provided by different agencies interested in solving the problems they are facing.

More basic and fundamental research work is, however, carried out at the Research Centre of Hungarian Academy of Sciences, Biological Research Centre of Academy of Sciences at Szeged is doing excellent work on Genetics, Plant Physiology, Biophysics and Biochemistry. The Academy of Sciences decides the specific trend of research that needs to be carried out. Based upon this, the scientists prepare projects. The projects are approved generally for a period of about five years. At the end of the period the projects are evaluated by referees.

More extensive research is however carried out by the Central Research Institutes. A large number of Central Research Institutes have been established all over the country. These Central Research Institutes belong to Ministry of Agriculture and Food. Many of these Institutes have been established long ago and have made significant mark at the international level. In some of these institutes the research work on production is linked with research work on processing. For example, the Vegetable Research Institute at Keoskemet besides having a field unit has a unit for research work on canning with a small canning unit attached to the Institute.

So also the Veticulture Research Institute has a wine making unit attached to it.

The Central Food Research Institute, Research Institute for Soil Science and Agricultural Chemistry, Research Institute for Plant Protection all located at Budapest. are first rate institutes. Cereal Research Institute at Szeged is also doing good work on plant breeding. Thus, there are several Research Institutes to cover both plant and animal production as also processing and canning technology. The Hungarian Meat Research Institute, Dairy Research Institute, Canning Research Institute are institutes entrusted with the task of solving the problems of meat, dairy and canning.

Special features of agricultural education and research in Hungary

1. The unique feature of agricultural education is that there is bifurcation for different kinds of training at different stages. The channels of higher education are, however, still kept open to provide for more or less continuous education for attaining high level of academic achievements. The specialized and correspondence courses provide opportunities for the employed persons to improve their qualifications and skills.

2. The agricultural education includes not only the subjects involved in production but also those involved in processing. Thus agricultural education on production is well integrated with the conservation of agricultural produce. Hungary has particularly very good food technological institutes practically for every major agricultural product. This linkage of production with processing of the product appears to be cardinal point that has been responsible for rapid development of agricultural economy in the country.

3. There is a great degree of diversity in agricultural education. The specialization at college and University level cover a wide spectrum of subjects. The specialization cover

subjects on production of different crops and animals, veterinary, forestry, baking, confectionary and technologies pertaining to vegetable oils, sugar, tobacco, food, fruit, milk and meat and farm mechanization.

4. A great stress is placed on practical work. The Colleges and Universities have extensive farms, well equipped workshops and processing and canning units. The students are also required to work on State and Cooperative Farms and Canning factories for their practical work.

5. Hungary with about 10.5 million population has comparatively a large number of agricultural schools, Colleges, Universities and well established Central Research Institutes. The main motive force for the rapid development of Agriculture appears to be due to the strength derived from these institutes because of their number, diversity and quality of work turned out.

6. Research work is carried out on time bound projects with a system of evaluation at the end of the period by a team of referees.

7. The buildings for research institutes are more functional and have been well planned to provide special facilities required for research and for housing special equipments.

8. The Hungarian Academy of Science is a unique organization that promotes high standards of scientific work.

Summary

Hungary has made great strides in the development of agriculture during the last three decades. Hungary has only about one-third the population of Karnataka, but has many more well developed agriculture-oriented schools, colleges, universities and well developed research institutions. There is considerable diversification in agricultural education. The

well organised correspondence courses provide good opportunities for continuing education to the employed persons to improve their technical competence. The training and research in agriculture production is closely linked with processing and preservation of agricultural products. The country's economy has been greatly improved with the rapid development of agriculture.

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INTER-STATE MOBILITY OF STUDENTS AND STAFF IN INDIAN AGRICULTURAL UNIVERSITIES

S. BISALIAH, A. V. RAI, R. NARAYANA AND S. V. PATIL

Sir John Russel, Director of Rothamsted Experimental Station of England, who visited India in 1936-37, at the request of the Imperial Council of Agricultural Research, to review the condition of Indian Agriculture, reported that, in general, the men who actually tilled the soil were scarcely touched by the national programme of education. Since then, the need for changing the plough as well as the man behind the plough had drawn the attention of leaders in the area of education. This need has found its expression in the establishment of Agricultural Universities in India since 1960s patterned after the Land Grant College Model. The Agricultural University movement in India has been acclaimed as the most significant educational development of the country, in view of well defined objectives set out for these universities. It is incontrovertible that technological capacities of the country in the area of agriculture have been augmented, technology transfer systems have been sharpened, and Indian farmers have responded favourably to technological opportunities open to them. All these have contributed for the emergence of technology-dominant productivity-led agricultural output growth pattern in the country. It is true that apart from

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Agricultural Universities, number of development departments have played the role of catalysts in the emergence of this kind of agricultural output growth pattern. However, the role of agricultural universities in developing the knowledge base and in training the manpower required for transmitting this knowledge to the rural community cannot be contested. The Agricultural Universities could have little or no impact without the necessary inputs of credit, fertilizer, plant protection chemicals, profitable prices and the management inputs of farmers. Without the knowledge input of the Agricultural Universities in terms of trained personnel, research results and the diffusion of these results through concerted extension efforts, the productive use of these inputs would perhaps be impossible. These observations are not meant to establish the equation between role expectation and role performance of Agricultural Universities in India, but to be suggestive of what has been made possible with the establishment of these universities.

Higher agricultural education has to be concerned with the education of qualified men and women who will occupy leading positions in the development of scientific agriculture, shaping agricultural policies and practices, agricultural research, teaching, administration and a wide range of agricultural services. In this context, the content and quality of higher agricultural education will exercise a profound influence on all aspects of agricultural development. It is in this perspective that the need for upgrading the quality of academic environment in our Agricultural Universities should be recognised, and this quality-augmentation should be treated as the second phase of Agricultural University movement as against mainly quantitative expansion during the first phase. There are different facets of planning for qualitative expansion, and the present paper is concerned with inter-state mobility of staff and students as one of the instruments for quality-augmentation of academic environment by containing

the problems associated with academic inbreeding. Added to this quality augmentation is the role of inter-state mobility in fostering national integration and a sense of belonging.

Two specific issues are examined in this paper. First, what is the extent of academic inbreeding prevailing in Indian Agricultural Universities and what are the possible avenues for promoting mobility of staff across the country? Second, how is the composition of students in these universities in terms of students from the home state, from foreign countries and from other states, and what are the possible instruments of inter-state mobility of students?

Academic Inbreeding and Mobility of Staff

Prof. Harold Laski of London School of Economics was not exaggerating when he wrote that, "the quality of a University is always in direct proportion to the quality of its teachers". The teacher is a centre from which eddies of thought spread, on his inventions and discoveries depends much of the progress and welfare of a nation and through him national culture is preserved, fostered and developed. It is in this perspective that Hannah (1959), a leader in the area of agricultural education, has remarked (P. 159): "Needless to say, the heart of an institution is its faculty and staff. No effort should be spared to get the best people available. Finding and keeping good staff is by far the most important job of any academic administration". But in the recruitment of academic staff, "Sons of the Soil Theory" appears to have held sway, as evident from the results reported in a study (1985) by ICAR, using data from 10 Agricultural Universities. Three results from this study are indicative of the nature and the magnitude of academic inbreeding :

- 1) Domicile status of the staff working in a particular university is one of the yardsticks for measuring the magnitude of academic inbreeding. Data from 10 universities covered in the ICAR study suggest that about 87 per cent of

the academic staff belongs to the states in which these universities are located. However, the cosmopolitan composition of staff varies with the development stage of a university. This could be better illustrated with the experience of G. B. Pant University of Agriculture and Technology, Pantnagar. This university, the first one to be established in the chain of Agricultural Universities, drew initially most of its staff from different parts of the country. But with the growth of the university, the cosmopolitan character of the staff composition has undergone drastic change with about 76 per cent of them belonging to the state of U.P. at present by the domicile status criterion. Yet another experience (e.g. Himachal Pradesh Krishi Vishwa Vidyalaya, Palampur) in this regard is that the proportion of the staff belonging to a particular state decreases as the level of the post goes up. In this case, persons from other states are recruited for higher level positions due to non-availability of qualified personnel within the State.

2) Place of acquiring higher education beginning from graduate to doctoral level is another yardstick for assessing the extent of academic inbreeding. Out of 2679 sample staff covered in the study, about 75 per cent had their Bachelor's degree from within the state and more than 40 per cent of the total sample had their first degree from the same university where they are working. About 71 per cent of the staff had their Master's degree from within the state, and 36 per cent from the same university where they are working. Out of 971 doctoral degree holders covered in the study, about 44 per cent were qualified for their doctoral degree from the universities located within the state, and 56 per cent from outside the state. As many as 26 per cent had obtained their doctoral degree from the same university, where they are working. Among doctorate degree holders, about 73 per cent of Professors, 59 per cent of Associate Professors and 41 per cent of Assistant Professors have obtained their Ph.D. degree from outside the state.

3) Out of those who had obtained any degree from within the Home State, more than 50 per cent had received education in the same university, where they are working.

The results on both the domicile status of the staff and the place of their higher education are indicative of high level of academic inbreeding that has gone on in our agricultural universities. With respect to the place of education, the degree of academic inbreeding decreased with an increase in the level of education. Perhaps, symptoms of deterioration in quality of agricultural education are perceptible, and these symptoms run through teaching techniques, learning methodologies, in the type and content of our examination papers, and in the quality of research output. It is fair to assume that academic inbreeding has been one of the major contributory factors for this deterioration, in addition to other exogenous and endogenous factors. It appears that academic environment of our universities are starved of cross fertilization of ideas, and law of diminishing returns has started operating in the productivity of academic interactions among the staff brought up in the same "school of thought". The basic question is what are the feasible instruments of mobility of staff so that the gains of cosmopolitan academic environment could be maximised. What kind of distinctive and incentive package could promote the kind of cosmopolitan academic environment which in turn could promote productive academic interactions in our universities.

The ICAR study (1985) has proposed some disincentives such as : (a) for purpose of selection, grade points of those who have had both their Bachelor's and Postgraduate degrees from the same university/state should be discounted ; (b) for recruitment, a condition under essential qualification may be included stating that not more than two degrees should be from the same university/state.

When it comes to implementation, it is not easy for operationalising these disincentives in an 'acceptable' manner. Instead, incentives should be offered to promote interstate/inter-university mobility of staff on a limited scale: (a) the possibility of reserving about 25 per cent of the academic positions to the persons from other states could be explored on an all India basis. A grant premium could be offered to those universities which fall in line with this norm. (b) provision could be made for the exchange of academic staff for one or two trimesters/semesters. These bilateral exchanges could be on 'head-for-head' basis. This exchange of staff on a limited scale for a limited period could act as an instrument of national identity, of enhancing the quality of academic environment, and of a chance for the staff to grow academically. Those who are sponsored under this programme could be provided some deputation allowance and housing facilities in the host university in addition to their regular salary. (c) the staff may also be provided the benefit of sabbatical leave, when they have an opportunity to work in another university on a well defined research project or a project on writing a book. During the period of placement in some other university, the staff should get the regular salary and be allowed to accept any fellowship or any other assistance of the host institution. Special chairs for visiting scholars and teaching fellowships could be created to promote this kind of mobility on a limited scale.

It may be possible for ICAR to provide some premium grants for agricultural universities to implement these incentive scheme to promote the staff exchange programme and thereby to enrich the academic environment of our universities. Implementation of these programmes, even on a limited scale, will provide opportunities for the staff to interact with their fellow scientists much more intensively than they could either in conferences or workshops. Added to this are the opportunities for students to get exposed to new ideas and new

methodologies which the staff under this programme are likely to circulate during their period of stay. This would really expand the scope of human intellectual capacity.

Composition and Mobility of Students

Establishment of geographical limitations for admissions to a particular agricultural university has been one of the major problems drawing the attention of academic administrators. Perhaps, universities would not wish to be narrow and provincial and they would wish to have students from foreign countries and from other states within the country as well. However, since its main objective is to serve the entity which has created and financed it, and since it has a responsibility to the tax payers and others who are supporting it, it is generally felt that admission from outside should be limited to a stipulated percentage of the total enrollment. Non-adherence at least to this percentage and all out upholding of 'sons of the soil theory' in admissions would narrow the cultural possibilities of the university. Academic value of admitting a reasonable number of foreign students up to about 10 per cent in the industrialised countries is an acceptable proposition. Member countries of European Economic Community have made it a deliberate policy to promote mobility of students through student exchange programmes. This student exchange programme has been considered as one of the excellent ways to promote socio-political integration of member countries.

The members of the European Economic Community have recognised the importance of student exchange programmes for national understanding, mutual appreciation of cultures and national communication. They have accepted this as a deliberate policy measure to enrich their university environment. This is indicative of the value of promoting inter-state mobility of students in our country. This exchange programme could be a memorable educational experience for individual

participants, and offers the students a challenge, an adventure and a learning opportunity. This programme responds to his need to equip himself for a life in the society that for him will be notional. It can function not merely as an instrument of personal development, but also an instrument of national identity.

Let us examine the available evidences on the composition of students in the University of Agricultural Sciences, Bangalore (Karnataka). It could be seen from Table I that

TABLE I
*Percentage of foreign students and students from
other states to total number of students in the
UAS, Bangalore : 1985-86*

Particulars	Total number of students*			Percentages to UAS Total	
	UAS	Foreign	Outside the State	Foreign	Outside the State
Undergraduates	2.748	40	125	1.0	5.0
Postgraduates :					
Master's Degree	683	16	77	2.0	11.0
Ph.D.	205	2	60	1.0	29.0

* Includes the student nominees from ICAR and the Government of India

about one per cent of undergraduates and Ph.D. students, and 2 per cent of Master's degree students are from foreign countries. About 5 per cent of 2.748 undergraduates in the university, 11 per cent of 683 Master's degree students and 29 per cent of 205 Ph.D. students are from other States in the country. These results are suggestive of the inference that at

the Postgraduate level, representation to students from other states is considerable, and at the undergraduate level domicile status restricts admissions excepting the ICAR and Government of India nominees' quota. In this context, it would be appropriate to examine the admission policy which the G. B. Pant University of Agriculture and Technology, Pantnagar (U.P) has formulated with respect to admission quota for students from outside the state. The Academic Council of this University has decided that 15 per cent of the seats at the undergraduate level and 25 per cent at the postgraduate level may be 'reserved' for students from other states, and admission to this quota is to be made based on merit as judged by an entrance examination conducted by this university. Since this reservation quota is in addition to 10 per cent reservation for the nominees of ICAR and Government of India, 25 per cent of seats at U. G. Level and 35 per cent at P. G. level are available for students from other states.

Three observations could be made on this liberal admission policy to promote inter-state mobility of students. First, this liberal admission policy should be followed by all the Agricultural universities in the country, and any unilateral move in this regard is likely to be met with protest from local students. A uniform admission policy with respect to reservations for students from other states need to be evolved. Second, the reservation quota for students from other states based on "merit alone" should be implemented without violating the basic structure of reservation policy followed by different agricultural universities in accordance with the directives from their respective state Governments. In this regard, the recommendation made in ICAR study (1985) that the UGC and ICAR must insist on removal of all regional restrictions on admission as a prerequisite for their support is far from realistic. Third, scholarships/fellowships could be used as instruments to promote mobility of postgraduate students. One major proposal in this regard is to make it

obligatory for the recipients of ICAR fellowships to seek admissions in universities other than their parent institutions. This appears to be really difficult from the point of view of implementation. The second proposal is to make provision for the award of scholarships/fellowships by the ICAR at differential rates. An incentive bonus may be attached to the award in the case of those scholars/fellows who seek admissions in universities outside their home state/region. This incentive bonus scheme for mobility is more a positive approach than the one which stipulates outside the state/region admission as a prerequisite for the award.

Concluding Remarks

We appear to be at the threshold of the second phase of the Agricultural University movement in this country. Quality-augmentation of agricultural education and consolidation of accomplishments made during the first phase of the movement could be the dominant theme for the second phase. Part of the contribution to quality augmentation could come from inter-state mobility of staff and students. The whole academic spectrum should be represented in mobility programmes. If universities are to be treated as conscious agents for change, these institutions could fulfil their missions through their staff and students. The teacher is an instrument of educational change as much as education is an instrument of national development. Provisions made for his mobility (even on a limited scale) across universities in different states/regions would be not merely a reward for his good academic work, but would also be a way to enrich the academic environment of our universities. This policies of different universities, and this is reflected very well in the nature and magnitude of academic inbreeding that has gone on in our universities. The incentive package proposed in this paper – a grant premium by ICAR to universities which reserve some stipulated percentages of academic positions to persons from other states, staff exchange programme for one or two

trimester and the provision of sabbatical leave – to promote mobility of academic staff could be examined for implementation on an all India basis.

It is realised that total confirmation to the 'sons of the soil theory' in admission limits the possibilities for higher education as an instrument of emotional integration of people from different parts of the country. So some liberal tone in our admission policies could promote inter-state mobility of students and thereby could contribute to emotional integration and to the enrichment of academic milieu of our universities. As discussed already, provision of a stipulated percentage of seats for students from outside the state should be an all-India policy. This reservation quota should be earmarked without violating the basic structure of reservation policies of state Governments. An incentive bonus in the case of scholarships/fellowships awarded by the ICAR to postgraduate students could be provided when the awardee seeks admission in universities outside his home state/region. This kind of incentive bonus is likely to be more effective than making it compulsory for all the awardees to seek admission outside the home state.

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AN OVERVIEW OF AGRICULTURAL INSTITUTIONAL REQUIREMENTS FOR ENSUING DECADES*

M. K. SETHU RAO

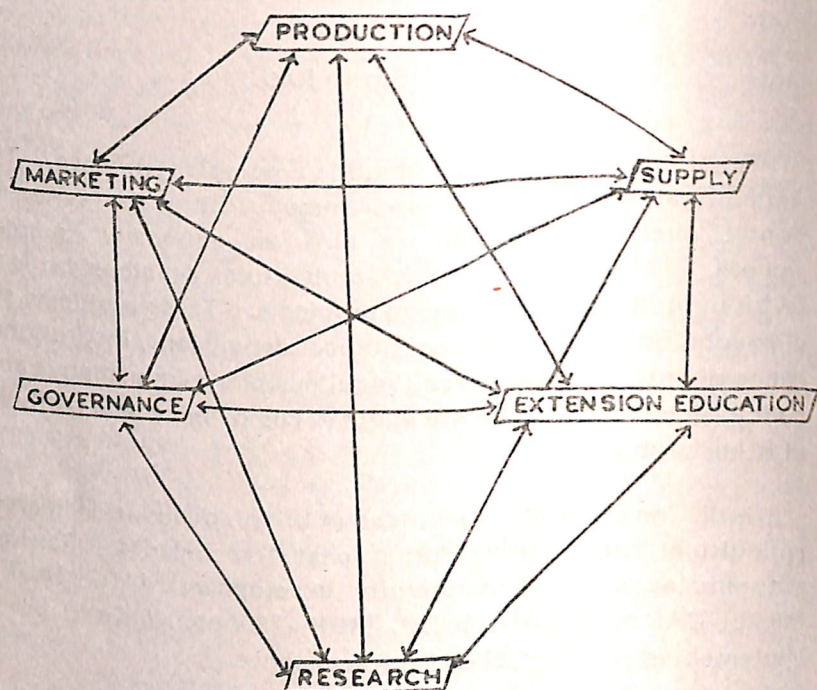
Rural development by nature is a complex process. The Agricultural development programmes within the vertex of overall rural development is also an extremely complex process. The setting, in which agricultural development is to be brought about poses many problems. These problems are of psychological nature, sociological dimensions, institutional arrangements, technological requirements, administrative and policy dimensions, change agency competency and plethora of other problems.

India has made big strides in bringing about increased agricultural production during past few decades. Several programmes such as community development, IADP, IAAP, MFAL, CADA, IDLAD, ICDP, IRDP, T&V etc., have all been implemented to bring about these changes.

It is also true that the entire research, education and extension organisations have been reorganised and restructured to meet new challenges and cater to the emerging demands. Likewise a number of institutions have come up for providing supplies and services to support the development programme. It is also noteworthy that the voluntary organisations and banking institutions have started applying a major role in this behalf. From the foregoing discussion it is quite obvious and apparent that agricultural development is a function of

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different systems such as research system, extension system, production system, supply marketing and governance system as depicted in the following diagram.

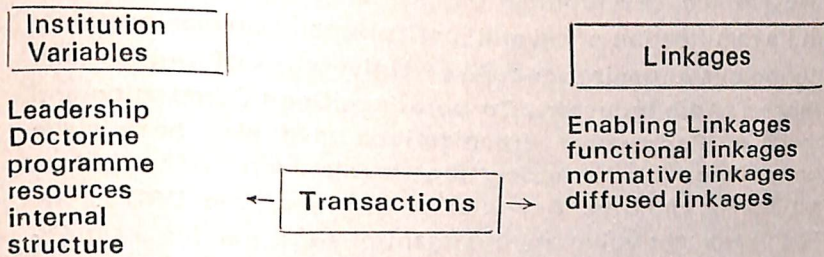


Functional components and linkage in an Agricultural Production system

It is also true that the institutional modification, institutional development and creating of new institutions is a continuous process to meet the expectations of different sectors of the society. Any institutional modification and creations of new institutions calls for a careful planning based upon the systematised procedures of institution development. In this context it is to be emphasised that institutional development and planning is more an aspect of social engineering based on the proposition that most significant and contemporary changes are deliberately planned and guided. Further it

presupposes that introduction of change for the benefit of the society primarily takes place through formal organisation. As Esman has pointed out, any planning for institutional developments and modifications need to take into account the dimensions of leadership, doctrine, the program, the resource and the internal structure. Each one of these components happens to be crucial and of continuous aspect of concern in the process of institutional development. In other words the whole process of institutional planning based on Esman's analysis can be diagrammatically represented as follows:

THE INSTITUTION BUILDING UNIVERSE



In the context of the agricultural development programmes which have been implemented during the 20th century such as the pre-independence programmes, general approach of community development, selective approach of IADP, HYVP, ICDP, IDLAD, Target group approach — SFDA and MFAL. Area development approach — CADA and DPAP and the latest strategies of special component and Training and Visit system need to be closely examined. Different types of institutional framework were provided for the varied programmes with specific objective in relation to different groups of the society. The existing organisations have been revamped and reorganised such as ICAR etc. New institutions like Agricultural University, National Seeds Corporation, Agro-Industries Corporation etc., have been organised to meet the situation.

Likewise major policy changes in terms of financing the agricultural sector through the nationalised banks. Regional Rural Banks and F.S.S. have also been implemented. The international organisations like Rockefeller Foundation, Ford Foundation, FAO and the World Bank have lent their share towards building up new institutions and financing several programmes. The results of these institutional changes have been a spectacular increase in agricultural production and reduction in import of foodgrains. The status can be summarised as a major quantitative jump in production. But a variety of problems remain unsolved. A look into institutional framework for agricultural development in Karnataka project a picture of many organisations and institutions engaged in agricultural development. These are the development departments of the Government with its ramification of several institutions in several locations. Autonomous organisations like University of Agricultural Sciences, Agro-Industries Corporation, Seed Corporation and a chain of Cooperative organisations have also been made equally responsible for agricultural development. The Nationalised Banks and other financial institutions, the DRDS, the Non-government voluntary organisations are playing a significant role in agricultural development. However, the production figure in foodgrains in Karnataka as given below presents interesting dimensions calling for an introspection about institutional requirement for agricultural production.

Total production of foodgrains in Karnataka

<i>Year</i>	<i>Production in lakh tonnes</i>
1976-77	48.23
1977-78	73.00
1978-79	72.43
1979-80	72.65
1980-81	62.29
1981-82	67.37
1982-83	61.82

In view of fluctuating trend of agricultural development, it may be desirable to have a fresh look at agricultural development itself during the coming decades of 21st century. The major focus for institutional remodelling for the 21st century may be in the vertex on the following lines :

1. Creating income generating opportunities appropriate for the mass of small scale agricultural producers through improving the productivity of their goods, services and markets ;
2. Contributing to a more equitable distribution of the increments in agricultural incomes through affecting the distribution of resources available to small scale producers ;
3. Contributing to the agricultural development aspect of broad based, integrated rural development efforts ;
4. Helping small scale agricultural producers to organise themselves, so as to allow them to participate as informed, vocal and counter-availing partners in the development effort, possibly with a view of helping rural people to develop, their own rural development acquisition system (Axinn, 1978).

As Krishnaswami indicated the emerging changes in agricultural situation in India calls for new institutional arrangements. It is worthwhile to consider the following.

The emerging changes in agricultural situation in India calls for new approaches. Small holdings up to 2 hectares have increased from 69.6 per cent in 1970-71 to 72-67 per cent in 1982-83. It is estimated that by 2000 A.D. marginal farms could increase by 33 per cent, while small, semi-medium, medium and large farm would decrease by 23 per cent, 29 per cent, 50 per cent and 69 per cent respectively. Marginal farmers are swelling the ranks of labour force because of

burden of new or old debts. In order to improve the situation, agricultural productivity of small and marginal farm should be raised. As suggested by Dr. Swaminathan, for enabling small and marginal farmers to produce more land reform should become 'ownership-cum-production' measure. It should include such measure as consolidation of holding, land levelling, soil health care, water management etc. These measures not only improve productivity but also generate additional employment.

In developing agriculture, the selective approach strategy should be given up, for the introduction of modernisation programme in selected areas has aggravated regional imbalance and increased disparities. Therefore, it is necessary to aim at developing agriculture in all regions including dry farming tracts through extension of irrigation facilities and a break through in dry farming technology. Agriculture is subject to the vagaries of monsoon. It very often suffers from drought, flood and or cyclone. The relief programmes organised on such occasions should be properly organised planned and used primarily for creating and maintaining social assets like tanks, roads, drainage, school building, community centres and community wells. Agriculture (crop production) alone cannot provide full employment to the rural people. Additional gainful employment should be generated through off-farm activities like dairying, poultry, sheep rearing etc. It is desirable to involve groups of households in order to make schemes viable.

Another major dimension that needs to be considered in terms of increasing the income and purchasing power of the farm family through educating and mobilising farm women and farm youth for action projects in villages. Hence, this calls for different types of institutional planning may be in the lines of Agricultural Development Centres of Egypt. This may be coupled with programmes of qualitative improvement in

terms of nutrition and employment generation through reorganised agricultural marketing and processing network.

An overview of the above situations necessarily demands structural changes in the existing institution of extension, education, research, supply and services and other organisations like Banks etc.

Keeping these in view the following institutional arrangements is proposed for institutional planning for coming decades.

1. The present arrangement of research organisation being a separate entity from the development organisations needs a fresh look to bring about a close integration and a purposeful planning, need-based research programme. This implies that the modelling of the institutions on the US approach to a certain extent may be worthwhile. This needs to be attempted on a limited scale and if found successful to be made applicable for the entire country at later stage.

2. It is necessary to institutionalise the agricultural research at the farmers level as participatory research programme rather than emphasising at research stations alone. This again demands the high degree of decentralization of research to bring about a dynamic functional link with farmers and extension workers.

3. Uptill now the planning process has been institutionalised at higher levels at the organisational hierarchy and to a certain extent at the district and block levels. To mobilise the efforts and to bring about resource mobilization and committed participation it is desirable to plan and execute action projects at homogenous cluster of village level. This can be attempted by organising the agricultural development centres at different clusters. These institutions will have all the facilities of extension guidance, adaptive research, farms, processing units, credit lending and marketing arrangement

banking facilities, mass communication facilities etc. The centre need to be managed by a committee of personnel drawn from above organisations and representatives of farmers and mandal panchayats. The funding of these centres for management can be shared on 70 : 30 basis of Government and farmers/village organisation.

4. Another aspect of institutional modification for the 21st century is in terms of creating a nodal institution at the district level to cater to the areas of preparing technicians, extension personnel, personnel required for Bank and Insurance Company and also to organise training programmes. As recommended by the G.V.K. Rao Committee (1983), agricultural polytechnics in every district is to be organised this could be done on the following lines.

The Agricultural polytechnics can be brought about by amalgamating the existing rural development training centres, farmers training centres, agricultural training centres and agricultural schools. The budget as well as personnel provided for these institutions in each district may be pooled for the proposed Agricultural polytechnics. The infrastructure and other facilities in terms of building, vehicles, farm, laboratory, farm power etc., may also be pooled. As recommended by the National Commission on Agriculture there can be an Apex body for overall guidance, supervision and control of these Agricultural polytechnics. It is desirable that each one of these polytechnics be headed by an Officer of the Rank of Joint Director of Agriculture. The apex body can consist of the Director of Agriculture and the Chairman with Additional Director, Joint Director of Training and 3 Senior Officers from the Department of Horticulture, Sericulture and Animal Husbandry as members. The Director of Extension of the University of Agricultural Sciences should also be included as member.

5. Growing demands for trained agricultural professional to different programmes will have to be met. It is also desirable in the best interests of the society that agriculture subject matter area be given prestigious position on par with other sciences. This attitudinal change has to be brought about in general public. This can be successfully initiated by organising Junior Agricultural Colleges at the Pre-University level. This can be brought about by restructuring the groups of subjects offered at pre-university level by inclusion of agriculture as an important area of combination with physics, chemistry and mathematics. The recommendations for creating these new institutions may be made on the following lines.

Though agriculture is a very important subject and main stay of the economy, it is surprising that agriculture subject has not received the due attention and emphasis at the Pre-University level. It is at this stage that rural youths need to be motivated and prepared to take up different carriers in agricultural avocations. This serious lacuna need to be rectified. This can be done by substituting agricultural subject instead of biology as P.C.M.A. instead of P.C.M.B. To facilitate this arrangement it is proposed, that, in each district a Junior College has to be designated as Junior Agricultural College, with the above cited subject matter component. The necessary minimum staff to teach Agriculture be provided to these Junior Agricultural Colleges and these institutions can take advantages of farm and other facilities of the polytechnics. These innovative Junior Agricultural Colleges can come under the purview of the Pre-University board or a separate management board be established for this purpose.

6. The present emphasis of working with farmers on piece meal approach emphasising on one enterprise like crop production etc., need to be reorganised in terms of farming system extension work in the already existing Training and Visit system arrangements. This calls for reduction in number

of farmers to be served by the extension worker as a multi-purpose agricultural extension worker.

7. The sector of farm youth and farm women yet to be mobilised to form major contribution for sustained agricultural development. This is to be brought about by restructuring the training institutions in the country. There is an absolute need to have extension officer youth and extension officer farm women within the framework of the T and V system at the taluka level. These functionaries need to be specially trained and functional job chart to be provided to work with this group of clientele has to be prepared. Likewise, there is need to have special extension functionaries at the district and state level also for the purpose.

8. The emphasis during the next few decades of 21st century will be necessarily on the weaker sections of the community who are to be treated as primary target group for agriculture and allied development. They are also to be given preferential treatment. Hence, it is proposed that extension organisation should designate special cadre of extension functionaries only to work with weaker sections of the community (SF, MF, AL, SC and STS). The emphasis in this approach is not only to provide extension guidance but also to provide the framework of management services taking advantage of different programmes and institutions in the area.

9. The Agricultural Universities are now engaged in research, teaching and extension. In view of the changing demands the emphasis in the University need to include in the area of environment, agro-forestry, agro-industries and agricultural management, rural energy resources etc. To meet these requirements the agricultural University should constitute disciplines and departments for the above said dimensions. It may also start institutions of agricultural management etc., afresh.

10. It is necessary to restructure the existing institutions and also to start the innovative institutions at the village level. The emphasis should be in line with the significant technological developments in the area of biotechnology, mass media energy sources, combined enterprises, computer science. This calls for a very fresh look at the very objectives of agricultural developments as an instrument for comprehensive change in standard of living of rural people.

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PLANNING PROGRAMMES OF AGRICULTURAL EDUCATION AT PRE-UNIVERSITY LEVEL : A PERSPECTIVE FOR 21ST CENTURY*

H. S. HANUMANTHAPPA

Education and training in agriculture are being regarded by Mosher (1966) as accelerators of agricultural development. But whatever the truth of the matter, it is the extent to which education and training has so far enhanced the provision of manpower resources essential to agricultural and rural development that should be the real cause for concern. In the third world, where the rural economies are of primary importance and the only sound basis for national development, agricultural education programmes have yet to meet the high expectations and hopes pinned on them by the planners and educators.

Manpower resources development for agriculture should be geared towards the attainment of three integrated goals: (a) a satisfactory solution to unemployment and under-employment in rural areas; (b) increased efficiency of agricultural production; and (c) improvement of rural living standards in order to increase the 'holding power' of rural communities, particularly for rural youth. These triple goals deserve to be the primary concern for focal point of planning, implementation, evaluation, replanning and further implementation of programmes of agricultural education and training at different levels in the country.

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More specifically, a national programme of agricultural education and training must provide development opportunities for the following groups :

1. Those who have already been involved in farming as an occupation (adult farmers) and feel the need to improve their occupational proficiency.
2. Those who intend to serve as extension agents, providing the important link between modern upto-date agricultural technology and farm operations.
3. Those wishing to pursue agriculture as a profession, either as teachers at agricultural institutions or agricultural scientists as researchers or as managers of agri-business enterprises.
4. The administrators who should possess adequate understanding of the nature and requirements of agricultural and rural developments so necessary in effecting the necessary legislation.

The present paper is concerned with those who belong to groups 3 and 4 of the population stated above.

Agricultural Education in Schools

In the early post-Independence period, basic education was enthusiastically supported and reinforced. On the recommendation of the Education Commission (1964-66) a large number of middle schools in U. P. were oriented as senior basic schools by introducing subjects such as agriculture, woodcrafts, tailoring, metal crafts, etc. Agriculture as a main craft was introduced in 52,654 Junior Schools and in 2600 senior basic schools (VI-VIII), especially in rural areas (Prasad, 1961). Although this movement took place in other States also, it did not make much headway. The concept of basic education as well as the introduction of multi-purpose schools and some of their variants, met with only limited success. The

intricacy of the subject could not be fully appreciated and translated into reality for various reasons. In view of the discouraging results, the Education Commission recommended and the Government accepted the 10+2+3 pattern of education. The pattern provides for work experience to be given to students during their ten years of schooling and, and at the higher secondary stage, vocational courses to be introduced in addition to the core subjects.

Karnataka's experience since the introduction of this pattern of Agricultural education has been dismal. In that, the students who opted for vocational course (agriculture) are up against the wall! This +2 vocational stream appears to be a 'dead-end' and thus calls for a change in the system and contents of instruction. Any over-loading the already burdened young students mind at the +2 level with complex and intricate principles and practices of agricultural education would be suicidal as they are mentally and attitudinally unprepared. A sense of frustration and resentment has descended on the cluster of students who have gone through the grill of vocationisation in agriculture at the +2 level as they are not salable in the job market! It is high time that policy makers, planners and educators should concertedly act to prevent the colossal wastage of resources of the State, as well as the dabbling with the career of the promising students.

Establishment of Junior Agricultural Colleges in the State

Presently, agricultural education and training at pre-degree level *i.e.*, at the pre-university level is very minimum. In a very few junior colleges, agriculture has been introduced as a vocational subject and as a terminal course. In these colleges, the students who take agriculture as vocational subject are neither eligible for higher education in agriculture, nor in engineering nor in medicine etc. In other words, agricultural education has not been brought into the main stream

of pre-degree education programme. This is rather strange in a country where agriculture forms the backbone of the national economy and over 70 per cent of the people live in villages directly or indirectly depending upon agriculture for their livelihood. Because of this lacuna, there is a tendency among the rural and urban youth so also the parents to consider the all important subject of agriculture and allied areas in a framework of not placing the same on par with engineering or medical education. It is at this stage, that the youth be motivated to develop a scientific attitude and liking towards agriculture and also to get a proper perspective and understanding of the immense potentialities that agriculture affords for employment as well as to generate the national wealth. Unless there is an inculcation of this attitude, agriculture may not receive the due attention needed by all concerned (Rao, 1984).

It is also estimated that only about 25 per cent of the rural youth coming out after passing S.S.L.C. enroll themselves in pre-university education. It is at this stage, that they must be motivated to carve out a career in agriculture profession, either to go for advanced studies or to take up a middle-level technician job and or to initiate input supply and service outlet and or to start a small agro-industrial unit. But it is also important to take into account that the chances of rural students to further their studies in the areas of engineering, medicine and other fields be jeopardised, by bringing about a big alteration in the pre-university level subjects.

In view of these considerations, it is imperative that the educational policy-makers and administrators rethink and redesign the system of agricultural education and training at the pre-university level. As a first step towards this, it is desirable to establish Junior Agriculture Colleges in the State (19 Colleges – one in each District) and it is recommended that agriculture be introduced as one of the subjects in Part-II with Physics, Chemistry and Mathematics instead of Biology

at the PUC level (*i.e.* , P.C.M.A. instead of P.C.M.B.). As the core subjects of PCM has not been altered, the students will not lose the opportunity of applying for admission to the degree programmes in Engineering, Medicine, etc. It is also to be noted that in the area of agricultural subject, certain important aspects of Biology is taken care of (the details of syllabus for agriculture subject at PUC level may be worked out at the appropriate time). Even though the present system of agricultural education at the pre-university level provides for agricultural component in Part-II which is overloaded with skills practise does not meet the necessary objective of creating awareness and appreciation of Agriculture as an avocation. Hence the need for redesigning the course contents has arisen.

The Junior Agricultural Colleges be started by bringing about necessary alterations or modifications in the 19 selected Junior Colleges in the State or they may be established afresh. It is very necessary that these colleges be started around the University Research Stations to have a functional linkage arrangements to take advantages of the infrastructure facilities which are necessary for teaching purposes.

These Junior Agricultural Colleges can come under the purview of the Pre-University Board or the Agricultural University or a separate management board be established for this purpose. A minimum staff of a Reader/Associate Professor, two lectures/Assistant Professors and 2 other supporting staff may be provided for each of the Junior Agricultural College to take care of teaching agriculture at Pre-University level. The intake of students to Junior Agricultural Colleges may be regulated depending upon the facilities available at the agricultural research station in the region.

Such a change in the existing agricultural education system at the pre-university level would serve as a pace setter

for meaningful and more profitable agricultural development in the State in the decades to come.

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REGIONAL AGRICULTURAL RESEARCH STATIONS SHOULD BECOME REGIONAL AGRICULTURAL INSTITUTES*

K. A. JALIHAL

The Agricultural Experiment Stations have played a very important role in increasing agricultural production in Japan, as a result of which few countries surpass Japan in the effective use of arable land or in the increased production per unit area that has been accomplished in recent years. This is primarily due to the functions performed by Japanese Agricultural Experiment Stations, since Japan does not have any formally organised institutions whose primary function is educating farmers or vocation training of students such as those found in other countries. Besides conducting agricultural research, these experiment stations in Japan also carry out agricultural education and extension work. Only about 50 per cent of the budget of these research stations is spent for research while the remaining portion is used for providing direct services to farmers including such items as growing seed of recommended varieties, raising animals for distribution to farmers, student training and formal education. The need for Agricultural Experiment Stations to take up agricultural education and extension work has also been highlighted by Vervelde (1966) in a thought provoking article "Relationship between agricultural research, instructions and extension". He pleads —

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“Advisory work, education and research now-a-days are considered quite distinct functions and often organised in different services or sections. This tends to cause a separation and even alination between the three. Differences in the atmosphere of their job make them drift apart still further and also tend to keep some of them away from the actual problems and needs of farmers...

Since the 3 branches of the agricultural services have the best possibilities to serve the farmers, if they act united and in combination, every effort should be made to integrate their activities...Some teaching and advisory tasks should be taken up by the research institutes”.

Mr. C. Subramaniam, Ex-Union Minister for Agriculture in his recent theme paper presented in a Seminar on Indian Agriculture held at Coimbatore in June 1982 has also pleaded for a strong research-cum-demonstration-cum-input quality checking stations in all states one for each given agro-climatic region / sub-region. According to him, the Agricultural Research Stations have to gear themselves up for a whole range of new tasks including to take the lab closer to land. Thus, it is clear that some teaching and extension tasks should also be entrusted to the Agricultural Research Stations. In India, this can easily be done by changing the objectives of the Agricultural Experiment Stations. A new name Agricultural Institutes should be given to the Agricultural Experiment Stations and they should be entrusted with the triple functions of research, teaching students/farmers and limited extension work.

To start with, all Regional Agricultural Experiment Stations should be converted into such Regional Agricultural Institutes. There should be a Director for such Regional Agricultural Institute who is sufficiently familiar with the three

functions to inspire all of them. Gradually, these Regional Agricultural Institutes should be further strengthened to enable them to carry out college teaching functions also. When this is done, the recommendations of the Radhakrishnan Education Committee of 1946 to establish Rural Universities can become reality.

One need not be afraid that such a reorganisation of Regional Agricultural Research Stations and transforming them into Regional Agricultural Institutes requires lot of money. It is possible to integrate every institute working in the particular region pooling their resources while establishing the new Regional Agricultural Institutes. It is also possible to utilise funds already spent in the region by bodies like Command Area Development Authority for this reorganisation.

Regional Agricultural Institutes for Karnataka

In Karnataka, there are 10 well-defined agricultural regions as indicated below :

1. North-eastern transition zone
2. North-eastern dry zone
3. North dry zone
4. Central dry zone
5. Eastern dry zone
6. Southern dry zone
7. Southern transition zone
8. Northern transition zone
9. Hilly zone
- 10 Coastal zone

There are also six Command Area Development Regions for different major irrigation projects viz., (1) Cauvery Basin Project, (2) Bhadra Project, (3) Malaprabha Project, (4) Ghataprabha Project, (5) Tungabhadra Project and (6) Upper Krishna Project.

It is therefore necessary to establish 10 Regional Agricultural Institutes for the rainfed crops and six Regional Agricultural Institutes for irrigated crops.

Most of these Regional Agricultural Institutes could be established by reorganising the existing Regional Agricultural Research Station and also by integrating some institutes located in the region. For example, in Zone 8 *i.e.*, Northern transition zone, there is an Agricultural College at Dharwad, Regional Research Station at Dharwad, Rural Development Training Centre at Dharwad, Agricultural School at Devihosur, a Krishi Vigyan Kendra at Hanumanamatti and Regional Extension Education Unit at Dharwad. All those institutions should be integrated into a Regional Agricultural Institute, Dharwad with the following functions:

1. Conducting research work for the region in Agricultural Sciences
2. College teaching
3. Training adult and young farmers and farm women
4. Carrying out limited extension work

An example for starting a Regional Agricultural Institute for a Command Area can be illustrated as follows:

At Arabhavi in Belgaum district, there is an Agricultural Research Station, an Agricultural School, a Farmers' Training Institute and also a Government Seed Farm nearby. All these can be integrated into a Regional Agricultural Institute for the Malaprabha area to take care of the following functions:

1. Carrying out research work for irrigated crops of Ghataprabha area
2. Training farmers, adults and young women in irrigated farming.
3. Carrying out limited extension work in the project area.

In course of time, the function of college teaching might be added by further strengthening of the Research Institute.

Beginning should be made in Karnataka, as the present Government has got a number of new Agricultural Projects to its credit like establishment of Dryland Development Boards and starting of Panchayat Raj system. It is therefore suggested that this Government should also examine this proposal of establishment of Regional Agricultural Institutes. A High Power Committee consisting of Agricultural experts and farm leaders should be appointed for this work. At least a Pilot work in establishing one or two such Regional Agricultural Institutes is a must.

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AGRICULTURAL EDUCATION FOR RURAL DEVELOPMENT*

S. V. PATIL AND S. BISALIAH

The document, 'challenge of Education : A Policy perspective', placed for a national debate last year by the Ministry of Education, Government of India, and the recent presentation of New Education Policy in the Parliament have highlighted the challenges confronting the nation in the education sector, and the possible avenues for evolving a broad based development-oriented educational system. These policy statements have recognised the maladies confronting our educational system – inequalities of educational opportunities, production of unemployable young men and women, progressive erosion of traditional values and culture, lack of effective links between the world of knowledge and the world of work, total dependence on government for resources etc. These statements have also identified five major concerns – reduction of inequality of educational opportunities, relevance of education to the country's development needs and expectations, utilisation of the existing educational infrastructure and improvement of quality of education, and the creation of a national system of education.

India is the land of villages, with about 75 per cent of its population living in rural areas. Widespread illiteracy, unemployment and under-employment and poverty are the outward expressions of the nature and the magnitude of under-developed nature of our rural areas. Agriculture is the main occupation of the rural people, with nearly 90 per cent of them eking a living from it. This agriculture-dominant occupational structure of our rural people has not changed

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during the last few decades, and it is not likely to change during the coming decades. Added to this are the avenues available for the transformation of our rural areas, by tapping the agricultural development potentials present in terms of favourable soil and climatic factors. Rural population lives in dispersed settlement areas, and this offers both an opportunity and a challenge for exploiting the natural resources. The employment and income opportunities can be created where people are settled. The basic question is how to make education a powerful tool for human resource development and thereby a tool for national development. The linkages between education, society and development are well recognised. But one of the major criticisms against the existing system of education in our country is that it is unrelated to developmental needs, and there is a mis-match between employment-income opportunities and the type of education imparted. The education model and the value system adopted during the colonial period continue to dominate our educational system. The system places more emphasis on acquisition of information, but neglect training in skills and social objectives of education. This appears to be much more so in the context of educational requirements for rural development. As a result, large stock of our rural manpower including the educated manpower is not productively employed. This places an urgency on the need for reconstructing and reorienting our educational system, and to relate it to overall developmental needs of our rural areas. Then the question is what is the knowledge-skill package appropriate for rural development, and what kind of institutional arrangements would promote the spread of knowledge and skill across different segments of rural population.

A Sketch of Historical Perspective

Historically, Indian agriculture was known for its diversification. This agricultural system was evolved through experience. With the advent of British rule, formal ways and

means of applying science and technology to agriculture were initiated with the establishment of agricultural schools, experimental stations and the Department of Agriculture. It was with the establishment of five agricultural colleges in the country around 1905 that higher education in agriculture was initiated. Only with this institutional frame, not much of connections and communications between science and farming could be established. Sir John Russel, Director of Rothamsted Experimental Station of England, who visited India in 1936-37, at the request of the Imperial Council of Agricultural Research, to review the condition of Indian agriculture, reported that in general the men who actually tilled the soil were scarcely touched by the national programme of education. Since then the need for changing the plough as well as the man behind the plough had drawn the attention of leaders in the area of education. This led to the realisation that the agricultural education system which had to provide knowledge and skill input to over 75 per cent of the population of the country had received scant attention. It was against this background of the need for forging education-rural development nexus that the Education Commission (1949) headed by Dr. S. Radha Krishnan had recommended the establishment of Rural Universities to meet educational, research and extension requirements of rural areas. The Joint Indo-American Teams (1955, 1960) made comparative study of the institutions dealing with agricultural education and research in U.S.A. and India, and recommended the pattern of higher education as was in Land Grant Colleges of U.S.A. The Kothari Commission (1964-66) recommended the establishment of at least one Agriculture University in each State. All these efforts have found their expressions in the establishment of twenty three Agricultural Universities in India since 1960s.

The New System

Establishment of Agricultural Universities in India since 1960s has been acclaimed as an innovation in institutional

development for transforming Indian Agriculture. These universities are expected to direct and sustain their major efforts towards bringing the full force of science and technology to bear on the problems of rural areas. The programme of education for agriculture is based on three main elements—research efforts to provide knowledge and skill base for the development of the appropriate technology to practising farmers, transfer of this technology to rural areas through extension, and training of the needed personnel through teaching. Philosophy of service and dedication to the rural folk is the guiding principle of the model. It is declared that practical utility, not snobbish academic responsibility nor any notion of intellectual aristocracy must be the sign post to direct the activities of these universities. These universities are supposed to have concerns for :

- all aspects of increasing, disseminating and applying knowledge related to agriculture and other allied enterprises practiced in rural areas.
- teaching and research directly and immediately related to the solution of economic problems of the rural areas.
- readiness to develop and teach the wide range of applied sciences and technologies needed to build up the rural economy.
- readiness to teach not only regularly enrolled students, but also to give specialised training to farmers and rural youth.

It is evident that these are well defined objectives set out for these universities. It is incontrovertible that technological capacities of the country in the area of agriculture have been augmented, technology transfer systems have been sharpened, and Indian farmers have responded favourable to technological opportunities open to them. Added to these is the

restoration of our national pride by eliminating our dependence on foreign food imports.

Ruralization of Agricultural Education

It is true that evidences are there to indicate that Agricultural Universities have been the major partners in the development and spread of new technologies, in promoting science-based agriculture among farmers, and in eliminating our dependence on foreign food imports. But there are some compelling reasons to indulge in an introspection on how far the agricultural education has 'deviated' from the major course, and what needs to be done to reconstruct and reorient agricultural education to meet the development needs of rural areas. Agricultural Universities have grown in their size, complexity and diversity of their operations in these two and a half decades of their founding. While promoting the idea of establishing Rural Universities, the Education Commission (1949) had recommended that these universities should have a cluster of 4 to 5 colleges, each having about 500 students strength, and education should be given in rural setting. Obviously, the environment of an Agricultural University should not be the same as other universities which are urban-centred with pronounced urban environment.

Added to these is the imperative of ensuring a meaningful existence for the depressed millions of our rural areas. There is an urgent need to formulate plans for preventing migration of millions of people from rural areas through the development of rural areas including the facilities for comfortable and cultured life. In fact, we have to reverse the drain of brain and resources from the villages to urban centres, if we are to accomplish the upliftment of rural economy. In this regard, we need to keep in view that we are coping at the same time four revolutions - industrial revolution, agricultural revolution, revolution of science and technology, and social revolution, dotted by the aspirations of the under-

privileged to participate in and benefit from various development programmes.

Reconstruction and Reorientation

The mobilisation of the scientific and technological resources of the country for rural development demands our willingness to evaluate the present system of education and our preparedness to examine the new options for reconstruction and reorientation. Reconstruction and reorientation are required to : (1) facilitate development, mobilisation, organisation and utilisation of the youth to involve and participate in the process of national development ; (2) establish dynamic and beneficial linkages between education, employment and development with due regard for the economic and social goals of the society ; (3) ensure equalisation of educational opportunities, both in regard to access and achievement ; (4) transform the system of education qualitatively in terms of its value, content, standards and relevance to life ; (5) develop curriculum with the goal of imparting necessary levels of literacy, numeracy, comprehension and functional skills related to local socio-economic factors and environment needs ; (6) create in the young generation an awareness of the emerging development perspectives and associated technologies ; (7) see that the benefit of science and technology percolate more effectively to the vulnerable sections of the community and backward areas of the country ; (8) evolve systems approach to educational planning and development aiming, *inter-alia*, at flexibility and mobility among different types and levels of education ; and (9) see that rural development education covers all formal education in the subject from the school to the university level and also non-formal education meant for those who practice the avocation and as well those who support it in various ways. Essentially, the worth of agricultural education has to be judged by its effectiveness as an instrument of rural development. These premises are kept in view, while the following suggestions

are made for reconstruction and reorientation of rural development education :

1. Diversification of education for rural development:

One of the goals of rural development is higher and diversified production. It is widely recognised that the general advancement of rural India calls for an ever-increasing range of quality of skills. In this regard, a brief exposition of the main features of agriculture education in Hungary, where nearly 40 per cent of the population is dependent on agriculture is in order. There are nearly 70 agriculture-oriented vocational schools, 60 Agriculture High schools, a large number of agriculture-oriented technical colleges, and six agriculture-oriented universities in a country of only about 10.5 million population, about half of which lives in rural areas. (1) The unique feature of agricultural education in Hungary is that there is bifurcation from ninth standard for different kinds of training at different stages. The channels of higher education are, kept open to provide for more or less continuous education from high school level for attaining high level of academic achievements. The well organised specialized and correspondence courses provide opportunities for the employed persons to improve their qualifications and skills. (2) The agricultural education includes not only the subjects involved in production but also those involved in processing. Thus agricultural education on production is well integrated with the conservation of agricultural produce. Hungary has particularly very good processing technological institutes practically for every major agricultural product. This linkage of production with processing of the product appears to be the cardinal point that has been responsible for the development of agricultural economy of the country. (3) There is a great degree of diversity in agricultural education. The specialization at college and university level covers subjects spectrum of subjects. The specialization covers subjects on production of different crops and animals, veterinary, forestry, baking,

confectionery and technologies pertaining to vegetable oils, sugar, tobacco, food, fruit, milk and meat and farm mechanization. (4) A great stress is placed on practical work. The colleges and universities have extensive farms, well equipped workshops and processing and canning units. The students are also required to work on State and Cooperative Farms and Canning factories as a part of their practical work.

It is true that the Indian agricultural Universities are expected to meet the rural development skill requirement by developing and teaching the wide range of applied sciences and technologies needed to build up rural economy. These universities have diversified their teaching programmes to train candidates in agriculture, horticulture, sericulture, veterinary sciences, fishery, dairy technology, marketing and cooperation, rural home science, forestry and agricultural engineering. The need for formal education programmes in the area of land and water resource development, agricultural education and journalism, agricultural product technology (to cover cotton, wool, tobacco, leather, wood, oil, sugar etc.,) and rural industries is also recognised.

The area of rural industries as a possible 'candidate' for educational programmes in Agricultural Universities has not drawn enough attention so far. In development process, we appear to have reached a stage wherein dominant dependence of rural people on crop production for making a living should be modified to encompass diversified occupational structure. Japan after its Meiji Restoration in 1868, geared up its educational programmes to make them relevant to developmental needs. By 1900, it had introduced compulsory education. Japan has a higher ratio of technical and skilled manpower to the total population, than many other Western Countries in the world. It is the educational system with emphasis on science and skill that has enabled Japan to achieve superior economic performance. The Japanese model of Rural Development offers an excellent example of productive farm-factory

linkage which has diversified employment and income opportunities for rural people. It appears that we are at the threshold of initiating a process of rural development wherein primary products are processed at the village level, and employment-income gains of value-added due to this activity are accrued to rural people. For initiating this development process, knowledge base has to be provided by Agricultural Universities through appropriate research, teaching and extension programmes. This is both an opportunity and a challenge for Agricultural Universities to make education relevant for development needs, instead of educational institutions engaged in producing unemployable youngmen and women.

Apart from imparting diversified teaching programmes at higher education levels, there is a definite need for orienting the educational programmes at the primary and secondary levels to focus in a general way on some aspects of knowledge and skills appropriate for rural development. Given the experience in the past of introducing agriculture as one of the subjects at the levels below the X standard stage, the recommendation of the Education Commission (1964-66) is worth endorsing. It is observed by the Commission that: "All Primary Schools including those situated in urban areas should give an agricultural-orientation to their programmes. We do not intend by this recommendation to add to the academic burden. Indeed, we are convinced that this dose not require special agricultural course, but only orienting existing courses in general sciences, biology, social sciences etc. A similar orientation towards agriculture should be continued in the lower and higher secondary stages". This kind of agricultural orientation in education is needed simply to create awareness of the problems of the farmers, to appreciate skills needed in farming and possibilities opened by science and technology including those of self-employment. Thus orientation of existing curriculum at the primary and high school level

towards agriculture and allied activities could provide a 'broad exposure' to students.

At Pre-University level, introduction of agriculture as one of the optional subjects at least in rural-based educational institutions is a possibility. But there should be a provision for them to enter any professional degree programme by taking bridge courses. Yet another proposal which is being considered is the establishment of agricultural polytechnics to supply a wide range of services for rural development with properly trained career persons. To carry out the messages of new technologies to the field, large number of technicians and skilled workers are needed at the lower level. This has become all the more necessary as modernisation of agriculture is creating multifarious employment opportunities. Those who get into these vocationalisation programmes of agricultural polytechnics should be given a provision for vertical mobility. The students passing out from agricultural polytechnics should be given opportunities for professional growth, career improvement and lateral entry into courses of professional education through appropriate bridge courses. This has been recognised by the Government of India in its pronouncement of New Education Policy. This could be accomplished by a three year programme in agricultural polytechnics after X standard, and another three or four years of study at the Agricultural University level to complete degree programme in one of the agricultural sciences. The course curricula of agricultural polytechnics need to be such that the students passing out from these institutions are also eligible to other professional courses such as Engineering and Medicine. These agricultural polytechnics could be patterned on community colleges in U.S.A.

All aspects of rural development cannot be covered under the formal education system. Therefore, it will have to be supplemented by non-formal education system at different

levels to remedy the missing links and to upgrade knowledge and skills of learners. The concept of non-formal education has been interpreted as embarrassing virtually all means of imparting knowledge and developing human resources outside the formal education system. The impression should not be left that non-formal education is meant only for the unschooled people or for rural areas. Actually, non-formal education exists most extensively and in greatest variety in the highly industrialised countries. Diversity of non-formal educational programmes for rural development could be realised, when the coverage is defined to include general education for imparting literacy, numeracy, change motivational orientation and training, improvement of health and nutrition, training in farming and allied sideline production, and training for small entrepreneurship and management to operate rural industries. All these should meet the learning needs of rural youths and adults in general, drop-outs and primary school leavers, women and girls, and workers and owners of farm and non-farm enterprises. The goal of ushering in a 'learning society' is possible by designing non-formal educational programme for those who could not attend formal system of learning-teaching, owing to economic and other reasons. Hence the need for complementing formal education with functionally relevant non-formal education. Formal agricultural education does not produce non-elite graduates who would settle for self-employment in agriculture. It is only the distance education for practising farmers and non-farmers which is likely to convert the traditional farmers into non-elite 'graduates' who would practice scientific agriculture and allied activities. Apart from the current programmes through Agricultural Universities, Farm Science Centres (Krishi Vignana Kendras-KVKs), Farm School in AIR and Correspondence courses which are mostly skill-oriented need more expansion. The KVK concept is emphatically against turning out diploma and certificate holders in search of

white-collar jobs. The emphasis is on 'learning by doing'. There is a need to graft a component for rural industries in each KVK so that each centre will develop as the nucleus for the spread of the latest technology in agriculture and agro-based industries. Modern technological aids for teaching can enhance the quality of learning environment of non-formal educational centres like this.

2. *Dispersal for augmenting regional technological capabilities*: The Education Commission of 1949 has expressed its opinion against crowding of undergraduate students in the main campus, and has recommended the establishment of small rural university campuses comprising of a ring of small resident colleges. Establishment of small Agricultural university campuses at District levels could help in dispersing the education system, and in establishing closer links between the world of knowledge and the world of work. The present proposal on decentralised teaching programme is meant to tailor the curriculum to meet the local conditions, without sacrificing the need for training in some core principles and subject matter areas. This proposal, if implemented, is likely to provide an environment so essential for cultivating in our youth the importance of working with farmers without inhibitions, for providing more opportunities for practical on-farm training, and for moulding them to uphold and to work for the progress of rural areas. This would avoid undesirable influence of urban education centres on our youth, and the rural youth will have a chance to get education with less cost and more of parental care and control. This may also help in promoting education among rural girls, as the parents may find it difficult to send them to urban centres. Further it would also motivate at least some of them to go back to their farms. Above all, if adequate measures are not taken for the dispersal of educational opportunities, the chasm of economic disabilities, regional imbalances and social injustice will widen further.

3. *Provision for earning while learning:* The college education is expensive. As a result, generally it is beyond the capacity of ordinary people in the rural areas to send their children to college education. In agricultural education, it is possible to provide opportunities for earning while learning. To some extent, this system exists in some of our agricultural universities. Small plots are given to the student to cultivate as part of their course work, and the students are allowed to retain the profit after paying for the material inputs which the university provides. This component needs to be further expanded to cover not only crop production, but also sericulture, poultry and other enterprises such as small scale agro-industries. This provision may not only help the students coming from the poor families to pay for their education, and also inculcate in them the work ethics and self-reliance.

Earning while learning is a common feature in American Universities. In the long summer vacation most of students go and work on the farms and in industries, and earn money to pay for their expenses in the University.

4. *Local financial resources and participation in management:* One of the challenges, as presented in the document, "Challenge of Education: A Policy Perspective", facing our educational sector is the progressive decline in resources available for education and the apathy of the community with total dependence on Government. This gives rise to the questions how to mobilize resources at the local level and how to make the community to participate in the management of the educational institutions. Apart from general consumers, farmers and agro-based industries are the direct beneficiaries of agricultural education and research. It is reasonable to present a view point that these direct beneficiaries should come forward to provide financial support to agricultural education and research. In Karnataka, farm produce worth Rs. 845.20 crores was sold through regulated markets during

the year 1983-84. Payment of one rupee as Agricultural Education and Research Cess for every hundred rupees value of output sold by farmers would generate an annual financial resource of about Rs. 8.45 crores which could support the proposed decentralised educational system. This proposal could cover other farm commodities such as sugarcane. This not only reduces the burden on Government resources, but also creates a greater sense of responsibility within the community. Regional Advisory Councils could be constituted to set the agricultural education and research priorities on which money so collected will have to be spent. Contribution of financial support by farmers and the participation of farmers in Regional Advisory Councils could usher in a new era of agricultural education which will meet the technological requirements of farmers in different regions for improving rural economy. The agricultural education system would become more responsive to the generation of knowledge and skills appropriate for the rural development of the concerned region.

Conclusion

Rural development is a process leading to improvements in agricultural productivity and allied activities, rural incomes and rural welfare. All round progress of the country cannot be accomplished without rapid development of rural areas. Human resource development through appropriate educational programme can be a great contributor to this development transformation of rural areas. Dispersal of agricultural education system through the establishment of small agricultural university campuses at district level, provision of diversified formal and non-formal teaching-learning programmes, institution of earning while learning schemes, mobilisation of local financial resources for agricultural education and research at the regional levels, and the participation of local people in the management of these dispersed institutions could provide the relevant basic frame for reconstructing and reorienting rural development education.

PRINCIPLES, OBJECTIVES AND OPERATIONAL COUNTERPARTS FOR EFFECTIVE CLASSROOM TEACHING**

S. BISALIAH*

Introduction

Development of the capacity to think critically and creatively in order to recognise and solve practical problems has become a major goal of education. Teaching and learning, the two mutually supportive components of an educational enterprise, involve the dynamic interplay of human personalities, the central ones being those of the teacher and the taught. But, many a times, the archestration of interests and attitudes of teachers and students is out of tune. It is not so uncommon to notice both teachers and students indulging in pointing out the mutual deficiencies. If teachers complain that students are not receptive enough to be encouraging, students complain that teaching is neither interesting nor inspiring to get them more involved in teaching-learning activities. This problem of lack of harmony of attitudes between teachers and students can be partly overcome by teachers giving special attention to creating a classroom atmosphere conducive to making the teaching-learning process effective. In this context, teachers should continuously sharpen the existing objectives and techniques of teaching and search for new ones to strengthen their teaching activities.

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This paper is an attempt to outline a few principles to guide teachers in conducting theory classes (Part A), and outline objectives and methods of conducting practical classes (Part B**).

Part - A

Principles to Guide teachers in Conducting Theory Classes

The basic unit of any educational institution is the classroom. Here is focussed the energies of the entire educational enterprise. Teaching and learning occur in this human matrix of pupils and teachers working together. The teacher should realise that the students rather than the teacher is the main reason for the existence of the classroom. So it becomes the responsibility of the teacher to make classroom atmosphere constructive for effective learning. Learning becomes effective when teaching takes an account of the experiences of students, provides scope for creative thinking, imagination and intuition, sharpens the analytic frame of mind, provides students with an integrated structure of knowledge, and caters to the mental tastes and needs of the gifted and less-gifted students. These ideas may be treated as principles to guide teachers in conducting theory classes.

1. Give theoretical content to students' practical experiences

If teaching-learning process is to be effective, the need for involving students actively in this process is so often emphasised. This objective of greater involvement of students can be attained, provided the teacher creates an environment for students to give expressions to their pre-class knowledge and experience. To make students feel free and confident to give expressions to their pre-class knowledge and experience, the teacher may raise certain practical problems related to the

** Ideas presented in this paper do have special bearing on teaching Social Sciences. Illustrations in support of principles of teaching are drawn from Economics.

topic under discussion and with which the students are already familiar.

An illustration : The following question may be raised before taking up the topic of Theory of Value of Money for discussion in the class :

Why do the levels of price, value of money and cost of living change ?

It is likely that at least a few students come forward with their unsophisticated answers to the question raised. The teacher may record these answers on the black board. This reminds the students of their knowledge and experience pertaining to the question raised. Now it is for the teacher to lead students from the world of known unsophisticated ideas to the world of unknown, more sophisticated scientific concepts and theories. This provides a theoretical content to experience and pre-class knowledge. After this, students may be asked to compare what they now know to what they knew before the teaching-learning activity in the classroom. If students become aware of this gap, they can leave the class with a sense of satisfaction, knowing that a definite increment has been added to their level of knowledge and understanding. The teacher can also leave the class with a sense of pride, because he has taught the students something new.

2. Provide scope for drawing out and developing the inherent perceptive intuitive and creative powers of students

If students' active involvement in teaching-learning process is a desired objective, teaching should encourage the development of students' inherent perceptive, intuitive, and creative powers. This is closely related to the notion of a discovery of new ideas. Setting the stage for accomplishing this objective requires the introduction of a special atmosphere into the classroom. For example, a teacher may lecture on a topic until he comes to a key point. He then stops lecturing and

lets the students take over. In the process, he provides scope for creative thinking and discovery of new ideas.

Illustrations: (i) In Macro Economic analysis there is a model of shifts of demand with output completely unresponsive. In this case, the teacher can stop lecturing at the point of full employment equilibrium and can raise the following question :

"Now you allow an upward shift in aggregate demand. How does this upward shift in aggregate demand influence the other variables such as the levels of price, employment, real output and the money value of output".

It is likely that most of the students make successful attempts to answer this question without much direction from the teacher.

(ii) While discussing the Pigovian and the Keynesian Theories of Employment, the teacher can stop lecturing with the following proposition :

"In the opinion of Prof. Pigou, a general wage-cut is a remedy for unemployment".

In this case, the students may be asked either to accept or reject the proposition with relevant reasons. It is likely that students offer different explanations some of which are roughly comparable to explanations advanced either by the defenders of the Pigovian proposition or by the critics of it. The teachers may have to refine some points advanced by students and cover points which the students have failed to perceive. Use of this approach may result in students becoming divided into different schools of thought on particular issues. The creation of such circumstances in which different schools of thought emerge can be an important means of deeply involving the students in teaching-learning process.

3. Provide specific opportunities for students to sharpen the analytic properties of their minds

If teaching-learning process is to be effective and exciting, there is need for developing in students a power of critical analysis in thinking. This may involve learning to read and think in a more disciplined manner. It may also involve an ability to reason out the consequences of alternative courses of action. This calls for a shift of emphasis in teaching-learning process from description to analysis. The question-set method emphasising the pre-class study aims at sharpening the analytic properties of student's minds. Under this method students come to the class prepared to discuss a particular question-set supplied to them well in advance along with the reference material.

Illustrations: (i) A question-set covering an empirical study of spatial marketing efficiency may be assigned to students. Questions can then be framed to help the students identify (a) the specific hypotheses placed under test, (b) the steps the author went through to test each hypothesis and (c) perhaps the details of why equations the author used made practical sense, how data were introduced into the equations and how the findings were interpreted in meaningful ways to potential uses of the research.

(ii) Suppose the Central Bank of a country has selected as its dominant objectives the simultaneous promotion of continuously high levels of employment and output, stability of price levels and exchange rate. The Central Bank is not empowered to control or regulate directly any of these important variables. It has to operate through its monetary controls. Suppose the Central Bank wants to take a specific action. The students may be asked to analyse how will this specific monetary action affect such things as the aggregate demand for output, employment, real output, interest rates and prices? How will the results differ from those that would

have prevailed if this action had not been taken or if some other action had been taken? Training students to think on these lines improves their capacity for analytical thinking and permits the achievements of insights and understanding on major issues.

4. Provide subject matter perspective to students through integrating bits and pieces of knowledge into a structured whole

Teaching-learning process is more effective, efficient and lasting, if course contents are properly organised and presented to students in a meaningful sequence. If teaching-learning process proceeds in a disorganised and meaningless fashion, the facts learned are not retained for long, nor does learning have much effect on understanding and intellectual growth of students. Therefore an effective system of teaching requires each course to be taught in such a way as to provide students with a 'structure of knowledge', that is integrated, instead of disjointed bits and pieces of ideas. This integration in teaching-learning process may be attained by bringing to the notice of students the central theme of the course concerned at the time of commencement of each course, and also reminds throughout the course on how specific issues relate to the course as-a-whole. At the end of a given course, teachers may follow the method of summarising, wherever possible, the contents of the course in order to ensure integration in teaching and learning.

An illustration: The central theme of a course in Monetary Theory consists of an analysis of the relationships between money and monetary policy and such economic phenomena as the rate of real output, the price level of output, the money value of output, and the state of employment and unemployment.

Discussions on Monetary Theory need to be planned and undertaken keeping in view the central theme so that every

topic discussed gets integrated with the 'structure of knowledge'.

5: Provide special learning opportunities (in given classes) for the most-gifted and for the least-gifted of students

Since students are drawn from different social groups and environments, teachers should recognise and operate on the assumption that their students differ in intellectual calibre and mental equipment. The most-gifted as well as the least-gifted of students deserve perhaps equal amount of, but distinctive consideration in effective teaching. One of the most challenging tasks for a teacher is to strike a balance in challenging the most-gifted and in accommodating the least-gifted of students. If a teacher fails to strike this balance, he fails either to challenge adequately the mental tastes and challenges of the most-gifted or to adequately meet the basic needs of the least-gifted of students. The intelligent mind grumbles, whereas the average mind feels neglected.

Assuming the willingness of teachers to work outside class hours, the method that may be proposed to meet the mental tastes and needs of students is to identify and categorise students (without necessarily making them conscious of the categorisation) into the most-gifted and the least-gifted. This categorisation can be based on the individual students' performance in previous trimesters, and their performance in class discussions, practicals and examinations in the current course which they are taking. The least-gifted of students may be asked to meet the teacher outside the regular class hours for discussions and clarifications on material covered in regular classes. This approach is intended to lend a helping hand to the below average students and improve their understanding of the subject matter. The most-gifted students may be challenged for example by being exposed to a few advanced works. This will give them recognition and encouragement, and can be an effective

instrument of helping them to become more resourceful. This kind of rational discrimination in meeting the mental tastes and needs of the most gifted and the least-gifted of students may fail to command appreciation; but this is a better alternative to leaving the most-gifted mind unchallenged and the average mind neglected.

Part—B

The Special Role of Practical Classes in the Teaching-Learning Process

Practical classes in physical and biological sciences, which permit of controlled experiments, are the integral components of the educational programmes of both traditional and agricultural universities. But practical classes in social sciences in Indian Agricultural Universities like the University of Agricultural Sciences, Bangalore, and particularly in the basic social sciences of Economics and Sociology are relatively new. Therefore, there is a felt-need for identifying the objectives and methods of conducting practical classes in social sciences. These objectives and their operational counterparts should provide a frame of reference for effective teaching and learning during practical classes : *

Objectives and their operational counterparts

Practical classes are conducted with special emphasis developing individual competence of students, encouraging the spirit of team work among students, and exposing students in meaningful ways to their economic and social environments.

(a) Developing individual competence

Individual competence can be developed by

* The Department of Sociology and Economics, U.A.S., Bangalore, has recognised a few objectives and methods of conducting practical classes. This section of the paper is based mainly on the experiences of the Department.

(i) improving students' understanding of concepts and theories.

(ii) providing scope for self-expression and independent working, and by

(iii) ensuring personal attention of teachers to each and every student. In fact these three ways of developing individual competence and principles 1, 2, 3 and 5 as discussed under Part-A of this paper are mutually related and supportive.

Exercise-work is one of the operational counterparts of the objective of developing individual competence. Under this method, students work out exercises on certain practical problems to illustrate concepts and theories. The students are also exposed to certain practical situations and asked to identify concepts and theories which can explain these situations within certain analytical frames. This, we hope, helps in improving students' understanding of concepts and theories, identifying the practical utility of learning, and providing scope for self-expression and independent working. When students work out exercises on certain problems, the teacher keeps on moving in the classroom, appreciating and encouraging those who work out the problem correctly, and guiding those who find difficulties. This ensures the personal attention of the teacher to each and every student. Further, this provides an opportunity for the teacher to identify the most-gifted and the least-gifted of students so that he would explore the ways and means of meeting the special mental tastes and needs of these students.

(b) Team work : a powerful instrument of learning

The second main objective of conducting practical classes is to ensure the excitement and spirit of team work. The rationale behind encouraging team work is to develop leadership qualities among students, instill in them the sense of collective responsibility and to create environment for learning

through informal discussions. In fact, team work also contributes for developing individual competence, since the limitations of individuals are exposed, and in the process members of the team help each other to overcome some of their limitations.

In view of team work as a powerful instrument of learning, groups consisting of five to eight students are formed to shoulder two specific responsibilities viz., preparation of assignments and presentation of seminars. Each group working under a student leader is encouraged to seek guidance of teachers in preparing its assignments. At the time of seminar, students are motivated to participate in discussions, since performance of each student is evaluated not only in the basis of answering questions raised by his fellow students, but also on the basis of his posing questions to others. Further, this kind of discussion serves the purpose of getting students other than those presenting the seminar acquainted with knowledge on this seminar topic; as the group presenting the seminar is exposed to intellectual challenges, the students may become aware that no skill is more vital than mastery of self expression.

Seminars, designed to sharpen the debating talents and self expression of students, are conducted in such a way as to ensure full scope for students participation. The teacher is to set the stage and motivate them for learning through discussions. Instead, if teacher monopolises the classroom the students are deprived of the opportunity to engage in learning activities. The activity of the teacher, although vital, is secondary and contributory to student activity. Teachers may have to participate in discussions, once in a way, however to clarify certain ideas and to direct discussions in proper perspective. In other words, teachers might be thought of as playing the role of academic umpires throughout the seminar.

(c) Field Trips : Exposures to rural problems

Since training students in problem-solving is one of the major goals of education, students should be exposed to environments under which they will have to work as professional persons. Perceiving and understanding of the nature of the environment would be developed through carefully selected literature and imaginatively planned field trips. Observation of rural economy and rural society against the background of theoretical frame is designed to train students in a systematic way of observing and analysing rural problems.

In addition to informal learning through observation at the time of field trips, students are to collect data on a specific topic. Teaching assists students in processing and analysing data and discussing the results of their study. All the students will have a chance to get others acquainted with what they have learnt of rural economy and rural society and get themselves acquainted with what others have learnt. This kind of training may facilitate students to come to understand the ways in which effective empirical measurements of their environments would be possible.

Summary and Conclusion

If one of the major goals of education is to train students in identifying practical problems and solving them effectively, the capacity of students to think critically and creatively needs to be developed. This demands that the teaching-learning process continually be improved. Teachers should continue to sharpen the existing objectives and techniques of teaching and evolve new ones. Part-A of this paper has outlined five principles to guide teachers in conducting theory classes effectively :

1. Give theoretical content to students' practical experiences.
2. Provide scope for drawing out and developing the inherent perceptive, intuitive and creative powers of students.

3. Provide specific opportunities for students to sharpen the analytic properties of their minds.
4. Provide subject matter perspective to students through integrating bits and pieces of knowledge into a structured whole.
5. Provide special learning opportunities (in given classes) for the most-gifted and for the least-gifted of students.

Objectives and methods of conducting practical classes in social sciences have been discussed under Part-B of this paper. In social sciences, practical classes are conducted with three main objectives :

1. Developing individual competence of students.
2. Encouraging team work among students, and
3. Exposing students to economic and social environments.

Exercise-work, team work through the formation of groups, preparation of assignments and presentation of seminars, and field trips are the operational counterparts of these objectives. It is hoped that some of the ideas presented in this paper will stimulate teachers to experiment with different approaches to teaching and that thereby the quality of teaching-learning process can be enhanced. A continuous attention to these principles, objectives and techniques of teaching can be a source of excitement and a meaningful experience to students and teachers alike.

Acknowledgements

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INTERNAL EVALUATION IN AGRICULTURAL UNIVERSITIES : SOME CRITICAL INPUTS

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Courses organised into semester or trimester, periodic examinations to get feed back on the effectiveness of teaching-learning process, and internal assessment are the broad features of the teaching programmes in most of the Agricultural Universities in India. The Indian Universities may be classified into three groups, viz., Universities continuing the traditional method of assessment with external evaluation, Universities with partly external and partly internal assessment, and those which have adopted totally internal assessment. Many of the Agricultural Universities patterned after the Land Grant College Model of USA have adopted the assessment system of 'internal evaluation'. There appears to enough experience accumulated over the period of last three decades to point out the need for recognising the problems of internal assessment and for identifying the critical key inputs required for making internal assessment more effective. This paper is an attempt in this direction to examine in broad terms, the problems and the critical inputs required to contain these problems.

1. Selection of Teachers

The dynamic interplay of human personalities those of the teacher and of the taught—in the classroom determines the effectiveness of teaching-learning process. Any slackness on the part of the teacher in getting himself prepared for offering the course, conducting examination, evaluating objectively

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etc., would disrupt the archestration of academic efforts between him and the students. His role is crucial in communicating the theoretical and practical knowledge to the students, providing scope for drawing out and developing the inherent perceptive-initiative-creative powers of students, providing special learning opportunities for the most-gifted and for the least-gifted of students, and promoting team work as a powerful instrument of learning.* This obviously drives the point that a considerable care has to be exercised in selecting teachers, and the university administration has to evolve suitable criteria for selecting teachers. Provision for merit/teaching fellowships for two to three years for students who have a high merit at undergraduate as well as at postgraduate level helps in attracting talented candidates for teaching profession.

2. Classroom strength

In many of the universities large classroom strength impedes the effectieness of internal evaluation. Whenever the classroom strength is more, the teachers find it difficult to come into close contact with students and it is difficult for them to have a close supervision on students' performance. Further, when the number of students are too many, it will be difficult to conduct tests, return answer papers in time, and to evaluate term papers and practical records. It is, therefore, desirable that the class strength is restricted to about not more than forty students.

3. Classroom Set Up

Either the trimester or semester system would call for coverage of a good lot of portion within a short time. The universities have to provide facilities in their communication centres for teachers to get their teaching aids like slides, film

*See Bisaliah, S., "Principles, Objectives and Operational Counterparts for Effective Classroom Teaching". In: Internal Evaluation System, UAS Eduaction Series No. 2, 1971, Bangalore.

strips, charts etc., prepared. Within the classroom, facilities for using audio-visual aids, exhibiting charts, models, maps etc., should be provided. It is also desirable that the classrooms are well equipped with projection facilities. Further adequate secretarial facilities have to be provided to teachers so that synopsis of lectures and other reading materials are prepared by teachers for distribution to the students.

4. More attention to practical work

The importance of practical work in a professional university needs hardly any mention. There is a feeling that not much attention is given to practical work by students in their course work. Practical classes are not given much importance in credits, and enough weightage is not given in the performance evaluation of students. Under the traditional system of agricultural education there used to be one practical work for every one hour theory, carrying equal number of marks in the examination. Under the trimester or semester system, the practical work is given hardly 10 to 20 per cent of marks in the total evaluation. To promote the interest of students in practical work, a considerable proportion of credit for practical work needs to be allowed. This in turn sharpens the 'how' dimension of their knowledge of technologies.

5. Preparation of Text Books and Library facilities

In many of the Agricultural Universities, definite text books are not prescribed for various courses. As a result, course contents are likely to be covered inadequately and students (especially Undergraduates) do not have access to reading materials for a particular course in a compact manner. The main difficulty is that text books with a coverage of all the reading materials for different courses are difficult to be found. To ensure the systematic offering of courses by teachers and learning by students, universities may have to promote the writing of text books by qualified teachers either within their respective universities or from outside.

There is a feeling that students do not have enough motivation to use the library facilities; instead, there is a feeling that they can complete the course with the notes which they prepare at the time of teaching. It is highly desirable that certain amount of reading assignment is given and the students are encouraged to use the reading materials in the Library. The teachers can make the 'rules of the game, known to the students *i.e.*, questions will be set on the reading assignment topics also. Coupled with this is the need for university administration to make reading materials available to the students in an accessible manner. With this, it would be possible to motivate the students to develop reading habits and thereby to foster the learning traits of comprehension and synthesis among students.

6. Desirable Number of Examinations

It is said that Examinations are essentially tests of total attainment, usually over an academic session. These examinations help to test the recall of knowledge, the ability to use it and the speed at which it can be applied. Teachers have to know how much their students have learnt at the end of each limited learning experience. Thus performance evaluation is a continuous and cumulative experience. The essential goal of continuous system of examinations is self-evaluation by teacher and student. Under Trimester or Semester system generally, four to five examinations are conducted. The purpose is obviously to watch the performance of students continuously and to provide the feed back for both teacher and students. Whenever the examinations are postponed, it becomes difficult to conduct these examinations in the proper sequence with the proper time interval. Many a times examinations are likely to be conducted even after the closure of the Trimester or Semester. If this happens, the very purpose of continuous watching of the performance of students is defeated. So it is worth considering whether the number of

examinations could be reduced to 3 to 4, and these examinations are conducted within the stipulated sequence and time.

7. Inter-campus and Inter-teacher Variation in Grading

One of the yardsticks for measuring the objectivity of the internal evaluation system is the 'consistency' in grading as between two campuses and as between grading by two different teachers in a given campus. But in universities where there are more than one campus or where two teachers offer the same course to two sections, differences in grading are some times conspicuous. This should be a matter of concern. A general pattern of grading indicating the percentage of different grades that may be given to students in a given class needs to be broadly decided, so that the similar pattern can be followed for other sections and campuses.

It is true that internal evaluation is a progressive method followed in our educational system. The Agricultural Universities have played a major role in implementing this system, and most of these universities continue to have commitment to this system in view of its merits over the traditional system of external evaluation. However, it is better to recognise the critical inputs required for its effective implementation so that the main tenets of the system are not sacrificed. Provision of these critical inputs in terms of selection of 'right type' of persons for teaching, optimal teaching load, optimal student strength in each class, proper classroom set up with required facilities for effective teaching, more attention to practical work, availability of 'text books' and library facilities, desirable number of examinations, and the methods for ensuring minimum variation in grading as between campuses and teachers could improvise the internal evaluation system as well as sustain it.

ORIENTATION TO TEACHERS FOR EFFECTIVE TEACHING UNDER TRIMESTER SYSTEM: A CONCEPTUAL FRAME-WORK

M. S. AMEERJAN*, B. R. BHADRA* AND
S. BISALIAH*

Introduction

Many teachers have certain notions of what teaching is and how it is to be carried out, though some of these ideas may not stand the test of scientific scrutiny. Consequently, they tend to develop no systematic conception of the process involved in teaching because they are inclined to believe that teaching is an art and not something to study about or get an orientation to; let alone undergoing a formal training. But scientific literature on effective methods of teaching, the learning processes and the factors which effect them has grown so much that it has become imperative on the part of new entrant to teaching profession to at least get an orientation to the fundamentals of effective teaching, if he wants to be a successful teacher.

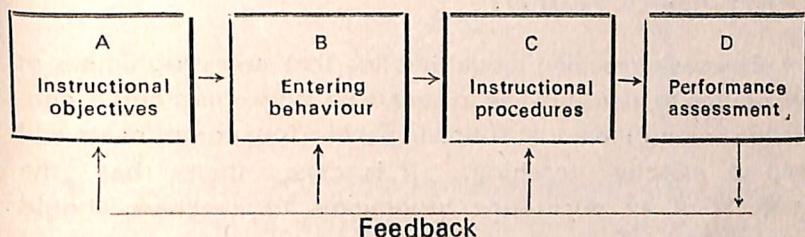
The trimester system of education is characterised by
a) teaching a subject matter in smaller units as courses,
b) offering a course for a smaller duration of fourteen weeks instead of one academic year, c) continuous evaluation of students in a trimester, d) providing information feedback to students by way of returning corrected answer scripts after each quiz/test, e) catering to the individual differences among students by allowing them to register for suitable

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number of credits in a trimester and f) providing opportunities for a dynamic interaction between the teacher and taught. Effective teaching under these circumstances, therefore, calls for a clear understanding of what teaching is and the strategies involved in it.

A Basic Teaching Model

The basic teaching model divides the teaching process into four components and it provides an adequate conceptualization of the teaching process.



A basic teaching model (Glaser, 1962)

a) Instructional objectives

These are the objectives students should attain after completion of a course of instruction.

b) Entering behaviour

This refers to the behaviour the student must have acquired before he can acquire particular new terminal behaviours (end products of instruction). In other words, this describes the present status of the student's knowledge skill and attitudes with reference to a future status the teacher wants him to attain.

c) Instructional procedures

These are teaching methods adopted by the teacher to realise the instructional objectives.

d) Performance assessment

It consists of construction and administration of tests to determine how well the student has achieved the instructional objectives.

If the student's performance indicates that he has fallen short of mastery or if his standard of achievement is less, then one or all the preceding components of the teaching model may have to be modified suitably.

Orientation to Teachers

The basic teaching model implies that any programme of orientation to teachers has to create an awareness and a conviction among them that following these four components will lead to effective teaching. It is clear, then, that the contents of an orientation programme to teachers should include (a) a knowledge of different types of instructional objectives and how to formulate them, (b) how to assess entering behaviour of the student which is relevant to his course, (c) providing knowledge of various aspects of different instructional techniques so that a teacher can use appropriate instructional methods suitable to different types of learning situations to realise the instructional objectives, and (d) the varieties of tests and how a teacher can construct objective tests to assess the realisation of course objectives.

This can be best achieved by having lectures on suitable topics followed by a workshop session for each of the four components. A model programme of orientation is given in the appendix.

a) Instructional objectives

The instructional objectives are statements of desired end performances of the student which can be attained and are amenable for the assessment of the degree attainment. Hence,

these objectives should be operational, that is, they should state precisely what a student should be able *to do* at the end of a course. The teacher must observe the following essential steps in constructing operational objectives :

1. Identify the desired terminal behaviour in a precise statement which the instruction attempts to achieve.
2. Specify in action words which are clear to the student as to how he is to demonstrate that he has developed the terminal behaviour (*e.g.*, solving five linear differential equations).
3. Define the conditions under which the demonstration of the learning will occur (*e.g.*, with/without reference books, tables or calculating devices, with/without time limitation etc.).
4. State the standards for acceptable performance (*e.g.*, 100 per cent mastery, listing, say, six factors out of ten etc.).

Workshop Session – I

Teachers should formulate instructional objectives for a course they teach, say, Agronomy..... Each teacher should present his course contents and the formulated course objectives for a discussion and revise them, if necessary.

b) Entering behaviour

The main objective of assessing entering behaviour is to avoid the folly of requiring the student to perform things for which he is inadequately prepared. The teachers, therefore, must determine what entering behaviour is required, assess them and make decisions based on the results of assessment. If the student lacks necessary entering behaviour, then teacher can (a) increase student's entering behaviour by review exercises, (b) provide more instruction than originally planned by beginning at an earlier point, and (c) alter the instructional

objective by choosing a different terminal performance or by lowering the standard. On the other hand, if the student has more than enough entering behaviour, then the teacher may decide to carryout instructional plans or alter them and begin instruction at a more advanced point.

Workshop Session-II

Teachers should identify the entering behaviour required for their course, for which they have formulated the course objectives in the workshop Session-I. Further, they should devise a test to assess these aspects of behaviour. These should be discussed and revised, if necessary.

c) Instructional procedures

A knowledge of (a) the learning processes and the factors that affect learning, (b) different teaching methods and when they can be used advantageously and (c) the different audio-visual teaching aids is a basic requirement on the part of a teacher. An understanding of these will enable him to choose an appropriate teaching method and aids to teach effectively the concepts, principles, problem solving and motor skills, if any, required in a course.

Workshop Session-III

Teachers should identify the concepts, principles and motor skills, if any, to be learnt and problems to be solved by the students in their courses as indicated in the instructional objectives. They should also select appropriate teaching methods for the same. Further, teachers must identify and/or design suitable teaching aids. They should present the same for discussion and revision, if necessary.

d) Performance assessment

Performance assessment is the basic source of feedback information on the adequacy of a student's

entering behaviour, course objectives and teacher's instructional procedures. The two major types of tests are essays and objective tests. The characteristics of these tests to a large extent determine their appropriate use.

Tests should have validity, reliability, objectivity and efficiency. A test which has these four characteristics (a) measures student's terminal performances described in the objectives, (b) measures these performances accurately or consistently, (c) can be scored without subjective judgement and according to expert opinion, and (d) makes optimal use of the available time of teacher and students.

Workshop Session-IV

Teachers should prepare different types of objective test questions to assess the instructional objectives formulated in the first workshop session. The same should be presented for a discussion and revise them, if necessary.

APPENDIX

A Blueprint for Orientation to Teachers

Introduction

Lecture - 1 : A basic teaching model.

Instructional Objectives

Lecture - 2 : Taxonomy of educational objectives.

Lecture - 3 : Preparing instructional objectives.

Workshop Session - I

- a) Formulation of instructional objectives for a course the participating teacher teaches.
- b) Presentation of course contents and the formulated course objectives for discussion.
- c) Revision of the course objectives, if necessary.

Entering Behaviour

Lecture - 4 : Knowing the students we teach.

Workshop Session - II

- a) Identification of entering behaviour required for the course, for which objectives have been formulated in workshop session-I.
- b) Construction of a test to assess these aspects of behaviour.
- c) Discussion on the above and revision of the same, if necessary.

instructional procedure

Lecture - 5 : The basic concepts of learning.

Lecture - 6 : Teaching for effective learning.

Lecture - 7 : Methods of teaching.

Lecture - 8 : Aids for effective teaching.

Workshop Session - III

- a) Identification of the concepts, principles, problems to be solved, and motor skills, if any, to be learnt by the students in their courses.
- b) Selection of appropriate teaching methods.
- c) Identification of existing aids for the purpose and, if necessary, designing suitable teaching aids (*i.e.*, flow charts, graphs etc.), learning operation of projector, overhead projector etc.
- d) Presentation and/or demonstration of the above for discussion and revision, if necessary.

Performance assessment

Lecture - 9 : Evaluation of learning.

Lecture - 10 : Construction of objective class-room tests.

Workshop Session - IV

- a) Preparation of different types of objective test questions to assess the instructional objectives formulated in the first workshop session.
- b) Presentation of the above for discussion and revision, if necessary.

Note : 1 While the above topics for lectures are the minimum required for an orientation programme, if time permits, it is worthwhile to have lectures and discussion on the following topics :

1. Programmed instruction and structured learning.
 2. Increasing class-room motivation.
 3. Steps to teach concepts, principles and motor skills.
 4. Evaluation of teaching effectiveness.
2. If the participating teachers are a heterogenous group, then the presence of senior teachers in the workshop sessions from different branches of, say, Agricultural Sciences, will greatly help in the formulation of course objectives, identifying entering behaviour, choosing appropriate teaching methods and aids, and finally, in the construction of objective test questions.
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